BROMOIL AND TRANSFER

by

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FOUNTAIN PRESS · LONDON

First published 1961

PRINTED BY JOHN BELLOWS LTD, GLOUCESTER

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Introduction

IT IS THE sincere hope of the writer that this manual, in addition to helping those who may not have had the success they hoped for, will also be the means of introducing new workers to a most delightful process.

The methods put forward, both of processing and brush technique have stood the test of many years practice, and if faithfully and carefully carried out will lead, without doubt, to success, inasmuch as an inked-up print should always result. Whether or not the finished result will be a success from the artistic point of view is outside the scope of this book and depends entirely upon the worker's expression and feeling.

It should be borne in mind by the reader that this is intended to be a strictly practical book, and deals with the process entirely from that point of view. It does not deal in a highly technical manner with the more complicated chemical reactions, and readers who would like to delve deeper into the chemical whys and wherefores must be referred to the technical works on the subject.

While it is true to say that there is, probably, no other process in use today which gives greater scope for control of tone values, etc. , this, in inexperienced hands - or in the hands of workers lacking in artistic feeling - can constitute a very real danger, and in such cases, infinite harm can be done to the good name of the process. It is quite certain that no other photographic process has passed through such trials and tribulations, as has Bromoil, and its derivative Bromoil Transfer and yet emerged to stand, as it does today, as perhaps still the finest of all mediums in the pictorial workers'

hands. It should be understood by the newcomer, that it is, when mastered, a means of producing *individual* work, and is, in no sense a method of making repetition prints. Neither is it a suitable process for the really impatient worker.

The fact that it has triumphed over seemingly insuperable difficulties is proof of the position it has held in artistic expression and it is certain that, had it not been so highly valued by leading pictorialists and exhibitors, it would have been abandoned long ago.

The process was evolved following E. J. Walls' suggestions in 1907, as an alternative to the earlier Oil Process, which had necessitated the use of a negative of the same size as the finished print - whereas Bromoil prints may be made direct from bromide *prints and enlargements.* Details were worked out by Welborne Piper, but many other workers can justifiably claim advances in processing details, with the result that bromoil had been reduced to more or less its present form before the 1920s. Originally, while there were no papers specially made for bromoil, almost any of the 'Ordinary' surface bromide papers would respond readily to the process.
As, however, swelling characteristics of the gelatin emulsion varied even from batch to batch at that time, several makers put a special bromoil paper on the market, presumably with controlled swelling characteristics, and such papers gave the bromoil worker full scope until, following the outbreak of the 1939 war, the best known, Kodak and llford, and presumably others, were withdrawn.

Meanwhile, manufacturers had been improving their emulsion coating technique and for many years before 1939 most bromide and chlorobromide papers had been supercoated to render them free from stress markings and more suitable for handling by the trade processing houses , etc . , but this improvement had rendered the papers seemingly impossible for use in the bromoil process.

Before the re-introduction of Kodak and Ilford Bromoil Papers, which took place some time after the end of the war, keen workers had found means of using 'supercoated' papers for the process, but as extra soaking and much more experience in pigmenting were necessary the re-introduction of bromoil emulsions was extremely welcome. Unfortunately the makers saw fit to finally withdraw these special papers some few years ago now, presumably for economic reasons. The papers available today, together with details of their characteristics, are considered in Chapter I, as, also, are the underlying principles of the process.

The primary object of this book is, when all is said and done, to guide the reader, if he be a beginner, to a degree of mastery of the technique involved, or on the other hand, if he has already advanced some way along the road, it is still my hope that the advice given may be the means of taking him still further on his journey towards perfection!

For that reason, great care has been taken to describe fully, the *simple* rules to be observed in processing the prints and also the much more complicated *description,* but still simple *practice* of brush technique. Indeed, contrary to general conception, it is my firm belief that the process is inherently quite a simple one, always assuming that the worker keeps the few basic principles well in mind and adopts the orthodox procedure set out in the following chapters.

Much has been written, from time to time, putting forward claims to so-called short cuts and numerous new methods, but it is a remarkable fact that, almost without exception, these have been short lived and finally abandoned by most workers. On the other hand, the normal methods advised herein, if followed meticulously, will not only prove to be simple to carry out, but will ensure an inked-up print every time - there should be no uncertainty as to whether or not the print will accept the pigment correctly. The success or otherwise of the

inked print will thus depend solely on the brush technique of the worker and his, or her, ability to produce the effect originally aimed at, without any *processing* worries or doubts at all ! This should always be the aim, and for that reason the principles of the process are explained, not in this Introduction, as is customary in a handbook such as this, but are reserved for the chapters dealing with the papers and preparation of the print, with which the principles are so closely linked.

Finally, I should like to re-emphasize the matter already touched upon, earlier in this Introduction, with reference to control and again make my plea for great care being exercised in the use made of the great flexibility in tone values made possible by the process. Especially in the case of a beginner, it is far wiser to concentrate on reproducing the original tones of the bromide print faithfully, until full proficiency in brush technique is attained, at least. Such a print, in the bromoil process, will always be worth making for the reason that the image lies on top of the gelatin emulsion and is not - as in a bromide print - buried in the emulsion layer. In the case of bromoil transfer one can have the added advantage of a beautiful hand-made paper directly under the pigment, while in both bromoil and transfer there is the attractive texture of the pigmented image and in the colour which best suits the subject.

G. E. W.

A New Development

SINCE THE main text of this manual went to press, the possibility mentioned, in Chapter X, of a new and more suitable paper becoming available, has occurred inasmuch as Kentmere Ltd have agreed to accept suggestions made with a view to improving their paper, for bromoil purposes.

I have had the privilege of testing out the experimental coatings for this purpose and the results have shown improvements far beyond even my own hopes.

As a direct result of these tests, which have been very thorough, Kentmere Ltd. have agreed to manufacture their normal matt D.W. grade paper with the new coating as standard, made *expressly for bromoil,* and this altered emulsion paper will be available even before the actual publication of this book.

The makers are to be congratulated on taking this step which will put a first-class *true* bromoil paper in the hands of the bromoilist once more, and I am sure this cannot fail to bring a new interest and new recruits to the process.

The revised emulsion will be found extremely easy to use -- at least equal to any of the special bromoil papers of the past, as referred to several times in the main text. No change in processing or handling is required except that, *being completely unhardened,* a much lower soaking temperature is needed. The actual main advantages of the new emulsion are: --

(1) Due to a thicker and richer emulsion, the relief is usually seen quite plainly in the gelatin, after bleaching and tanning, while the bleaching itself is more complete, with little trace of residual image, due to the unhardened emulsion.

(2) Pigment acceptance is extremely good and a remarkable degree of richness can be quickly built up by normal brush work. The thicker emulsion layer has given the double advantage of producing the ideal quality in surface sheen and moisture retention in the matrix. This latter allows brush work to proceed with little, if any, interruption for re-moistening during inking, especially on smaller or medium sized matrices.

(3) The new emulsion gives very good transfers readily with added ease in producing sufficient contrast in the inking of the matrix. Hot pressed and other similar final support papers should, however, be soaked, as explained in Chapter IX.

With this new emulsion paper *(normal matt D. W. only)* soaking for inking should be carried out for 30 minutes at 70°F, instead of 95°F as stated in ChapterV, and it should be distinctly understood that *all other grades and types of Kentmere papers remain unaltered,* and their soaking temperatures etc., are still as stated in the relevant chapters of this book.

CHAPTER 1

The Process and Papers Discussed

A 'BROMOIL' is a bromide or chlorobromide print on which the original image is replaced by an image consisting, entirely, of an oily or greasy pigment. This pigment is applied by means of specially designed brushes, by hand, in stipple form, to a previously bleached *and tanned* bromide print.

The print, having been processed in a combined bleaching and tanning bath (based on the tanning effect of Potassium Bichromate on the gelatin of a gelatino-silver emulsion) it will be found that, after finally fixing and washing, the image has become, in fact, simply a layer of gelatin, differentially hardened in exact proportions to the amount of metallic silver in the original bromide print, but with the silver image bleached away. Thus, the darkest shadow portions will be very hard -- the high lights unhardened, and the middle tones partially hardened, in proportion. Such a print or matrix, as it is now, after drying and resoaking in water for a predetermined time, will, absorb water in *inverse* proportion to the original silver image. The shadow portions will remain hard and will absorb little or nothing, while the high-lights will absorb water freely.

If the greasy pigment is applied to such a matrix while it is moist (but free from surface water, of course) it will be found that, while the hardened portions will accept the pigment, the unhardened parts, being full of water, will reject it, and by applying the pigment in the correct manner a replica of the original silver image can be formed on moist gelatin.

The whole character of the image is under the control of the worker – he can produce a very fine grain stipple, or on the

other hand, a coarse one -- and the relative strengths of shadows and tones can be modified to suit his requirements. Tone or colour of the pigment is at the choice of the worker too, and this is a great asset, if used with discrimination.

A Bromoil Transfer is produced similarly, but when pigmented, the ink is transferred to a suitable piece of paper, to the worker's choice, by pressure through a roller press -- such as an etcher uses, and thus, in its final form a transfer consists simply of pure pigment laid directly on to the chosen paper base, without any intervening gelatin layer. A print intended for transfer may be made reversed, from right to left, so that it will be viewed correctly after transferring.

A transfer may be, and frequently is, made by inking the matrix either wholly, or in part, more than once and transferring the additional inkings, in register, on to the original one. Therefore the matrix may pass through the press several times in making the transfer and this method, which adds greatly to the scope for 'control', is known, obviously, as multiple transfer.

On the other hand completion of the transfer may take place with one pull only.

PAPERS FOR BROMOIL

In theory **any photographic paper, having a gelatino-silver emulsion will be found suitable for bromoil or transfer, but in practice this is not strictly correct, unfortunately.**

The supercoating presents certain difficulties and there is also the important question of surface. The ideal surface is one as near as possible to the old `Ordinary' surface which went out of fashion in the 1920s or thereabouts, it was practically matt, but with just a suspicion of sheen.

The more recent 'Royal' surfaces were also very suitable, but at present there appears to be nothing between a dead matt and the various lustres and 'satins' in many makes of paper.

The supercoated papers can, in some cases, be used by means of special processing, but a surface having too much sheen (and consequently little or no tooth) will not hold the applied pigment and, in many cases, such papers are useless from the point of view of bromoil. The pigment is too prone to leave the surface and be picked up again in subsequent brush action.

Undoubtedly the best papers available in this country today are the non-supercoated bromide papers made by Kentmere Ltd. These are sold specifically for bromoil and are made in white matt and cream matt, both double weight, and also in 'art' surface, the latter being in single-weight substance and white only, at present. Usually a double weight paper is much to be preferred owing to the liabilities of a thin one to cockle or kink.

However in this case, the single weight paper is quite easy to handle, with ordinary care, and the surface is not a dead matt but has the right degree of sheen. Similarly the Kentmere double weight matt papers also have a slight sheen and accept pigment perfectly.

All types of Kentmere papers are stocked by James A. Sinclair & Co. Ltd. of 3 Whitehall, London, S.W.1.

Ilford Ltd. make a single-weight paper, specially for the Carbro process, which works quite well for bromoil and is obtainable to special order. The soaking temperature for this paper is somewhat lower and it appears to work well at approximately 75°F. for 30 minutes.

In addition to the above mentioned there is one, at least, which although supercoated, can be treated as a non-super-coated paper -- it is softly coated, and when once the ink is coaxed on (it is a little tricky at first to persuade. the pigment to 'take') it inks up well. This is Agfa 'Portriga-Rapid', a richly coated chlorobromide, made with white, ivory, and cream tinted base in fine grain Royal surface only. The initial diffi-culty in persuading the ink to take is probably due to the

supercoating, but as, with this paper, the soaking temperature must not exceed 70°F., it is not classed with the normal super-coated papers which are discussed later -- in Chapter X -- all of which require a considerably higher soaking temperature.

Instead of achieving ease in inking by means of a pre-bath at high temperature, a longer soak at the moderate temperature must be relied upon with Portriga-Rapid. Both the soft and normal grades work well -- the latter with the developer suitably diluted.

There are doubtless many other papers, now and to come, which can be used for bromoil, but for ease in use, and especially so by the beginner, it would be wise to *commence* by using the Kentmere series and leave experiments until proficiency in inking technique is reached!

COMMON PITFALLS

As pointed out in the Introduction it is my opinion that the process is really quite a simple one -- always provided that the worker uses ordinary care in processing, etc. -- a care, it might be added, which *should* be exercised in any photographic process, but which many of us are sometimes guilty of for-getting! Before going on to the preparation of the print, it would be as well to mention some of the more common pitfalls here.

First and foremost, at the risk of boring the reader, I must place cleanliness -- in dishes and making sure that none are contaminated with chemical remains.

This is especially important between the fixing dish and the bleacher -- indeed it is almost essential that a separate dish is used solely for the bleacher, and for no other purpose. In the original washing of the bromide print after fixing and before drying and bleaching, it is quite essential that this is done most thoroughly.

During processing, and indeed at all stages, whether the

print is wet or dry, any handling, other than by the 'safe' edge, should be avoided, and care must be taken to avoid *cracking* the emulsion, for obvious reasons.

A warning should also be added on the question of light-fog on the original bromide print. This question is often overlooked, but an unsuitable darkroom lamp filter is often the cause of difficulties in inking, due to a consequent, more or less slight, general fogging.

This may be almost imperceptible, but if it is present at all, difficulties may be caused and therefore it would be a sound idea, at the outset, to check up on the lamp by leaving a piece of the paper to be used, exposed to its light in the darkroom for some time while half or partly covered. Then, after developing and fixing the test piece, it should, upon careful examination, show whether or not the lamp is unsuitable and requires a change of filter.

This change should unhesitatingly be made if there is even the slightest trace of fog on the exposed part of the test piece.

A general fogging of the print will mean a *general tanning* during bleaching -- with consequent difficulties in inking.

The prevention *of chemical* fog which would also cause difficulties in inking, is ensured by the use of the Amidol developer mentioned in the chapter dealing with the processing of the print (Chapter III).

CHAPTER II

Materials and Equipment

A LIST of the necessary equipment may look formidable but, apart from the brushes, it is quite inexpensive. It may be built up gradually, and a good start can be made by the beginner obtaining a trial outfit, such as that sold by Messrs J. A. Sinclair. This contains a small bear-hair brush, pigment, etc., and although a hog-bristle brush and a pot of hard pigment, which I consider are essentials, are not included in the trial outfit, their purchase in addition to the outfit would enable the worker to begin.

Brushes are fairly expensive, but if looked after carefully, will last almost a lifetime. I am using, regularly, brushes bought at intervals since 1924, and my favourite brushes are some I have had since 1937. No worker can have too many brushes, but quite good work can be produced with the list of items which follows and which should be regarded as a *minimum* if anything larger than half to whole plate size work is contemplated.

BRUSHES. Since the 1939 war, the original type of brush has been unobtainable. This was a polecat fitch brush and was quite remarkable for its springiness. A very good substitute has been produced by Messrs J. A. Sinclair, in bear hair, which, while it has not quite the spring of the original 'fitch', nevertheless works quite satisfactorily. Like the polecat fitch it is, or should be, made with the natural tips of the hair uncut, the hairs being laid in a manner which produces the nicely domed 'stag-foot' shape of the brush, with little or no trimming.

The bear-hair brush produces a fine grain and is used *after* the initial roughing-in of the hard pigment, which is more easily and quickly done by means of a larger and harder form of brush. This latter type is of hog-hair and is sold under the name of the 'Mortimer' brush -- so named after the originator. It is considerably less expensive, size for size, than the bear-hair, and is of the same stag-foot shape. Mortimer brushes are made in three sizes, numbers 2 - 3 and 4.

The number 3 or 4 Mortimer will be found to be the most useful size, and a good start can be made with only one brush of this type. A further Mortimer can be added later, and will be very useful, but is not essential to start with. If only one is decided upon, at first, it would be advisable to choose the number 4 size, as this will deal quickly with the initial hard pigment work on even the largest print, while it will work equally well on small prints. Its use ensures the necessary degree of contrast in the final result and, of course, saves a deal of extra hard wear on the more expensive brushes.

Two should be considered the absolute minimum in the case of the bear-hair brushes -- more are highly desirable, but if cost is of primary importance, a start can be made with two. The worker will soon realise the truth of this advice and will, no doubt add to the number as his interest in the process develops.

Numbers 28 and 14 are recommended but a big saving can be effected by substituting numbers 16 and 10 (the last-named size is that supplied in the trial outfit already referred to). Additionally, a further very small brush is advised for spotting and detail work. Either the $^{3}/_{16}$ in. detail brush or the number 3 bear-hair being suitable for this purpose.

INKS (OR PIGMENTS). The very best inks, *Encre Machine* and *Encre Taille Douce for* bromoil have not yet reappeared in this country since the 1939 stocks were exhausted. When, and if they do, they cannot be too strongly recommended for warm

black pigments. *Encre Machine* readily gave contrast and was a 'hard' ink although easily spread, while the *Taille Douce* was a 'soft' ink, used either mixed with the *Encre Machine* or, in the later stages of pigmenting, used by itself.

These are now replaced, respectively by pots of hard ink and tubes of soft, the hard inks being Hard Black and Hard Brown only. The tubes of soft ink are in a large range of colours ranging from black, blue and green, through sepia, browns, yellows, reds and even white. All are suitable for intermixing.

The most suitable for use as a beginning are blacks and browns and therefore a good start could be made with a pot, each, of hard black and hard brown, together with a tube of black and one of, say, burnt umber or brown-black. Until fully proficient in inking technique, it would be wiser for the beginner to avoid the very warm colours, such as warm sepia and red chalk as these are, generally, much softer in working, and consequently more difficult to manage, in the hands of the inexperienced. To generalise, softness in working appears to increase in direct proportion with the increase in warmth of colour. A full range of pigments are stocked by Messrs J. A. Sinclair.

MEDIUM. I fear I must differ with most writers on this process in advising, *at least in the case of a beginner,* using, as he must present-day bromoil papers, against the use of medium at all. More will be said on this subject when dealing with actual inking technique, but I consider it is quite unnecessary to use it, except in very exceptional circumstances.

PALETTE AND KNIFE. The best form of palette is the ordinary white or cream glazed tile, preferably with the popular semi-glossy or satin glazed surface, and of the full standard 6-in. size. Three of these should be obtained.

A not-too-flexible, round pointed palette knife is also necessary, and this should be of the ordinary table-knife shape and *not* the 'trowel' pattern.

PIGMENTING SUPPORT. A sheet of plate glass should be chosen, of a size somewhat bigger than the largest size of print contemplated. The heavier the plate glass, the better.

COTTON WOOL. This is required for swabbing the print at times and also for holding the matrix under the soaking water. A roll of the ordinary hospital quality, not containing antiseptic, is all that is required.

VISCOSE SPONGE. This will be very useful and must be of the close texture and not the coarse honeycomb type. It must not, on any account, be harsh.

CHAMOIS LEATHER. This is a *must*. It need not be a large piece, 15 in. or so square is ample. It should, however, be very carefully chosen and should be the softest and smoothest procurable.

BLOTTING PAPER. It is advisable to make a practice of using only the photographic quality blotting paper or board, although it is not strictly necessary for any use *after* the matrix has been fixed, following bleaching. Any slight hypo contamination will not affect it then, but by using only the photographic quality throughout, there is then no risk of using the wrong type, accidentally during the earlier stages of processing, which might lead to troubles that would be hard to trace.

RUBBERS. A 'plastic' rubber and also a small piece of plasticine, for use on the moist print, during inking. The latter is especially useful as it is a great help in removing small broken hair ends, etc., during inking. The plastic rubber is used similarly and also for removing small local spots, flaws, etc. A finishing rubber is also required. This is, usually, one of the green, long-shape, bevel-ended ink erasers, and is for use on the dry print, and, as an additional help in finishing on the dry print, a small retouching lancet (or pen-nib trimmer) will be found most useful.

CLEANING FLUID. Either petrol or carbon-tetrachloride will be required, for cleaning the brushes, palettes, and knife. Carbon-tetrachloride is both better and safer, but is more expensive.

The above items, together with a supply of old rags, which should preferably be of the 'shirting' type -- free from lint and fluff, will complete all the special items necessary, apart from the chemicals used in processing.

CHAPTER III

Preparing the Bromide Print

THE NEGATIVE

IT HAS BEEN frequently stated that a negative intended for the bromoil process must be somewhat on the soft side, as regards contrast, and to a certain extent this has been true, inasmuch as such a negative could be printed normally and developed in the standard bromoil strength developer, but it was never wholly true, as, by adjusting the exposure given to the print and also adjusting the strength of the developer, allowances could be made which would cover quite a wide range of negative contrasts, both softer and harder than the ideal. More recently, papers appear to be giving a much longer scale of gradation and it will be found that all the papers actually named in Chapter I are of normal grade. Previously, all the special bromoil papers -- Kodak, Ilford and the rest -- were of the soft grade, exclusively, as it was found that in pigmenting a matrix made on normal grade paper, it was very difficult to avoid excessive contrast in the resulting bromoil. This does not apply now and indeed, if a rather soft negative has to be used it is necessary to take steps to ensure *enough* contrast in the pigmented print. This is done by the adjustments mentioned, i.e. in developer strength, exposure and, within rather narrow limits, by adjustment in development time, and finally in the brush work during inking.

A good standard negative for the process should be a well-graded negative of normal (but not excessive) contrasts, and for first essays in bromoil, such a negative should be chosen.

SIMPLE PRECAUTIONS

As already mentioned in Chapter I precautions must be taken against anything which might upset, in any way, the truly selective tanning which must take place later, during the bleaching operation. Two possible sources of trouble in this respect were touched upon, the first being light fog, possibly due to a faulty darkroom lamp, and it is assumed that the reader will have taken steps to preclude any such possibility. The second source of possible upset concerns the developer chosen for processing the bromide print.

It is well known that most developing formulas are prone, in varying degrees, to give rise to chemical fog and a general tanning of the print during development, and it will be quite clear to the reader that developers which offend in this respect should *not* be used, if difficulties in pigmenting are to be avoided -- and surely this must be our primary aim always! Probably, indeed almost certainly, the worst offenders in this way are the M.Q. developers, in all their forms.

Many workers have, in the past, claimed that they have used M.Q. and allied developers quite successfully and this may well be perfectly true, but nevertheless their use does introduce a possible and even a probable cause of trouble, and as there is a very simple solution to the problem readily to hand, one would indeed be foolish to persist in taking chances.

THE DEVELOPER

The solution to the problem is the use of an amidol developer which is quite free from any tendency to produce chemical fog. It is a simply prepared developer and, while it has the disadvantage that it has to be freshly made for each batch of prints, this is, in reality an *advantage* in that it cannot have been badly stored, or stored too long.

The only developer recommended for the bromoil process is, therefore, an Amidol formula, and without any doubt at all,

in my opinion, it should be used always, to *the exclusion of all other developers.*

A suitable formula for bromoil is

Sodium sulphite (cryst.)	**...**	**$^1/_2$ oz.**
or (anhydrous)	**...**	**$^1/_4$ oz.**
Potassium bromide (10% sol.)	**...**	**10 minims**
Water		**to 20 oz.**
Amidol		**20 grains**

The chemicals should be dissolved in the stated quantity of water, in the order given and used without further dilution. This developer will not keep -- it must be used within an hour or two of mixing.

The above formula represents, approximately, a half-strength standard Amidol developer and is suitable for use in developing prints from the average standard bromoil contrast negative. In the case of excessively soft negatives the developer can be used with the water reduced to 15 or even 10 oz. – the remainder of the formula remaining unaltered.

On the other hand, if excessively contrasty negatives are being used, more water can be added, say 25 oz. instead of the 20 oz. given in the formula.

If preferred, a standard packeted amidol developer may be used, but if so, double the stated amount of water should be used – thus reducing it to a half-strength solution which is approximately the correct average strength for bromoil.

There should be little difficulty in making up the formula quoted, however, even if the worker has little or no facilities for weighing, as when once the two chemicals *have* been weighed, it should be possible to employ the old dodge of securing plastic spoons or similar containers which 'fit' the correct amounts, and by using these in future, a batch of developer -- sufficient for the work in hand -- can be quickly prepared.

THE FIXING BATH

This must be a plain hypo bath, of the strength given, and freshly made up for each batch of work, as follows:

Hypo crystals	**2 oz. (min.) -- 3 oz. (max.)**
Water	**to 20 oz.**

On no account should acid hypo be used and it is perhaps unnecessary to add that any form of hardener would be quite fatal - when it came to the pigmenting stage!

PRINTING AND DEVELOPING

When making the bromide print it is advisable to use test strips and to develop for a fixed time with the developer at the standard temperature of 60° to 65°F., and the print should be masked to give a a margin of something like $^1/_2$ in. all round, as a safe-edge, to avoid any handling of the print surface at any stage of the processing, *or when dry.*

The exposure should be such that on developing the print for 2 minutes, at standard temperature, a somewhat heavy and dull print results. Ideally, the print should show full details in both the highest of the high-lights *and* the darkest of the shadows, and with the type of negative recommended, and the combination of the half-strength developer and 2 minutes' development, such a print will automatically be produced. The colour of the print will be far from good, judged from accepted bromide print standards, but good colour is not required for one purpose, and, most importantly all the detail in the high-lights will be represented by differing tones -- with a slight tone even on the highest -- while the shadows will *not* be blocked-up and will also be represented by a series of dark tones. (See Fig.1.)

In the event of using a more contrasty negative, the effect of slightly weakening the developer, as already suggested, but keeping the development time constant, will automatically

mean a comparative increase in exposure to produce a print having approximately the same characteristics as that from the recommended type of negative.

On the other hand, when dealing with an *extremely* soft negative, it may be necessary, in addition to using the stronger developer suggested, to develop the print for a slightly longer time, if necessary up to $2^1/_4$ or even $2^1/_2$ minutes, but this is the only modification in development time which should be entertained, and development time should *never be less* than the 'standard' 2 minutes.

To recapitulate, the aim is to produce a print having no blank high-lights and no clogged-up shadows -- and we can forget about the half tones, which will look after themselves. We can also forget about the somewhat muddy and dull appearance of the print!

The above instructions will produce satisfactory prints for subsequent tanning and pigmenting, using any of the papers recommended in Chapter 1, or any other *non-supercoated* paper, but if, later, the worker wishes to experiment with any *super-coated* paper, *it* will be found, in general, that a heavier print is required with still more tone in the high-lights, and this will result in a considerably darker print throughout, as explained in Chapter X.

I have found the foregoing method of producing prints for the process far easier and more certain than many methods which have been put forward from time to time. Especially so, as it compensates for quite big differences in negative contrasts quite automatically and produces, over a big range, more or less uniform results, for either bromoil or transfer. There is a small difference required in the depth of print when transfer is the objective, but this point is explained in the chapter dealing with transfer, and does not concern us here.

FIXING AND WASHING

After development, the print should be rinsed quickly, but thoroughly. If transferred to the rinsing water by hand, this should be by means of the safe-edge and the moment the print is immersed in the rinsing water it should be released and held by another corner of the safe-edge, this is to avoid carrying developer, trapped where the print is held, over into the fixing bath which, being non-acid, would quickly be contaminated.

After this thorough rinse, the print should be transferred to the already prepared fixing bath, and kept face down and fully immersed. It should be kept on the move in the fixing bath, which *must be freshly made,* and it will be fully fixed in approximately 5 to 6 minutes. This fixing must be thorough but not prolonged beyond the time stated as, longer in the fixing bath appears to result, later, when inking the high-lights, in the danger of loss of subtle high-light detail. Care should be taken, therefore, that the print is kept fully immersed and does not stick to the bottom of the dish, or to another print.

After fixing, the print should be washed in running water for, preferably, two hours. Both the fixing and the washing, at this stage, are of great importance and both must be thorough. Again, while washing, care should be taken to ensure that the print is kept well immersed and moving to make sure of really thorough removal of hypo traces, and two hours should be considered quite essential.

When washing is complete the print should be removed from the water and laid face up on a piece of clean *photographic* blotting paper. The face of the print should then be swabbed clear of 'tear drops' by using a squeezed-out clean viscose sponge. The print can then be hung up to dry by means of a clip on one corner of the safe-edge. It must hang freely while it is drying, and drying should be thorough.

After thus preparing the print for bleaching and tanning, it may be stored in readiness for the next stage.

CHAPTER IV

Bleaching and Tanning

AS ALREADY indicated in Chapter I, a correctly bleached and tanned bromide print should be, ideally, a matrix exactly a replica of the original print but in *relief* instead of having a fully visible image in tones.

This relief will be more or less microscopic, owing to the comparatively thin gelatin layer, but nevertheless it will be present and should have all the nuances in *depth of relief* which the original print had in depth of image tones.

When fixed, it will become simply a differentially hardened gelatin layer and when such a matrix, after drying, is correctly resoaked the gelatin layer will be found to absorb water exactly in reverse proportion to the hardness of the gelatin, and also, therefore, in inverse proportion to the original gelatino-silver image.

All the above may appear quite frightening to the newcomer, and indeed may give the impression that the processing of prints for bromoil might well be more of a laboratory matter than one for the average amateur worker, in his darkroom. Such, in fact, is not the case and it will be found that with ordinary commonsense handling no difficulty at all will be experienced in making perfectly satisfactory matrices.

It is always a source of wonder to me, even after many years of working the process, just how much the tanned gelatin will stand -- including the final brushwork! The only real precautions to be taken are to ensure that no abrasions occur to the surface and that all handling is by the safe-edge only,

while actual kinking or cracking of the gelatin must, naturally, be avoided.

It will, by now, have become quite clear, however, how necessary it is to avoid any risk of upsetting the balance of the minute relief by any form of fogging and also the importance of avoiding any contamination in the developer, bleacher or fixing baths, which points were emphasised in the previous chapter.

Over the years, very many bleaching and tanning formulas have been put forward and in view of the fact that so many well-known workers have differed so widely in their opinions as to the best bleacher to use, one can quite conceivably be doubtful as to which one to choose, at least initially.

Doubtless the big majority of the formulas put forward worked quite satisfactorily, but whether or not they would all do so with modern papers must be, to some degree, doubtful. I have used one or two bleachers which differ from the one I have now used for very many years, and I propose to include these, as alternatives, but I do suggest that the beginner uses the first of the formulas which follow -- at least when starting.

BLEACHERS

I have used this, without any alteration, for all types of papers, both supercoated and non-supercoated, for many years, and see no reason to depart from it. It works consistently, and appears to work well in both hard and soft water districts -- a big point this, which does, no doubt account for the differing opinions of workers on the merits or demerits of their favourite 'brew'. It is cheap and easily made up as a stock-solution, and in that form keeps indefinitely if stored in a dark bottle (or stone jar) away from the light. I usually use *briskly boiled* and partly cooled water when making up any bleachers.

I believe this is a sound precaution, especially in very hard

water districts, and cannot but assist the keeping qualities of the stock solutions. It is a modification of the original Ilford formula, the concentration being more readily soluble and without any tendency to crystallize out in storage in cold weather, which I found did occur with the original concentration.

Copper sulphate ... ... 1 oz.
Potassium bromide ... ... 1 oz.
Potassium bichromate ... ... 25 grains'
Sulphuric acid (concentrated) ... 20 minims
Water ... ... to 16 oz.

Add the acid to the water first. For use add three parts of water to one part of stock solution.

What appears to be a similar type of bleacher to the above is the Sinclair Bromoil Bleacher, a proprietary formula which also works well and is conveniently packed to make 20 oz. solution.

Further bleachers, used by many workers in the past are: --

Cupric chloride ... ... 160 grains
A Sodium chloride ... ... 21 oz.
Hydrochloric acid ... ... 3 minims
Water ... ... 10 oz.

B Potassium bichromate ... ... 55 grains
Water ... ... 10 oz.

For use take 1 part A ; 1 part B; 2 parts water.

Also the following: --

10% solution Copper sulphate … ... ... 5 oz.
10 " " Potassium bromide ... ... 5 oz.
1% " " Potassium bichromate... ... ...21 oz.
Hydrochloric acid ... ... 3 minims

For use take one part of the mixture and add two parts of water.

FIXING BATH

The fixing bath, for use after bleaching, is a fresh, plain hypo solution, as follows: --

Hypo crystals … … … … … … 2 oz.
Water … … …… … … … … 20 oz.

and this bath should *not* be stronger than stated.

DRYING AND 'SUPERDRYING'

Before describing the simple operation of bleaching and tanning, there is one point to mention and it is, I believe, of the very greatest importance in ensuring success.

At any stage where the print or the matrix is dried, the drying should be extremely thorough, to the point of real crispness. To ensure this I have adopted a rigid rule of super-drying with completely successful results.

To apply the method, the bromide print, after being normally dried following development, fixing and washing, should be hung in a warm cupboard or even suspended in front of a fire (at a safe distance to avoid scorching) to ensure crisp dryness, before it is again soaked for bleaching.

This superdrying should be again carried out on the matrix *after* it has been normally dried and ready for pigmenting. This may appear to be a waste of time, but experience has proved that this superdrying conditions the gelatin, thus making the ready acceptance of the pigment consistently certain.

After being normally dried (followed by the superdrying), the print or matrix will be found to curl strongly, and by testing a corner of the safe-edge, the print will be found to be crisp and springy. In such a condition the gelatin is ready for the next operation to be carried out.

BLEACHING

The dried (and superdried) print should be placed in plain

OXSHOTT WOODS. Bromoil print.

Fig. 1 (see chap. 3): A typical bromide print for bromoil -- illustrating the depth of printing and full details in all parts, including the darkest areas.

Fig. 2 (see chap. 5): The appearance of the matrix after the initial application of pigment by No. 1 brush action.

Fig, 3 (see chap. 5): The appearance of the matrix after cleaning up the initial inking (see Fig. 2) by the quick application of No. 2 brush action -- with the uncharged brush.

Fig. 4 (see chap. 5): The appearance of the matrix after additional application of hard ink (see Figs. 2 & 3) and the remoistening of the surface. This illustrates the building up of a contrast.

IN THE WARREN. Bromoil print

water at ordinary room temperature, and allowed to soak for at least 5 minutes, and meanwhile the bleaching bath should be prepared. Sufficient stock solution of bleacher should be diluted to working strength to bring the whole to a temperature of 65 -- 70°F. but *not higher.*

The dish, which it is advised to keep solely for this purpose, should be a little larger than the largest sized print to be used. Say a 10 x 8 in. dish for 1/1 plate prints, and, incidentally 1/1 plate is quite large enough for initial attempts, especially if the worker is not fully proficient in brush technique.

The fresh hypo bath should be all ready mixed and in the fixing dish.

The whole of the bleaching operation can be conveniently carried out in ordinary artificial light, in the darkroom.

When the print is thoroughly soaked and limp, it should be taken from the soaking and laid, face-up in the empty bleaching dish. Any surplus water should be drained away from the dish before the bleacher is poured over the print. It is important that the bleacher covers the print in one sweep, so that the whole surface is covered evenly and quickly and the dish should be kept gently rocking until bleaching and tanning is complete.

Assuming that 3 - 4 oz. of working strength bleacher is used in this operation (for say a 1/1 plate print), and that the temperature is not less than about 65°F., visible bleaching will proceed fairly quickly and progressively, with the high-lights disappearing first, followed by the half-tones and finally the shadows will also go -- the deepest portions of the shadows being the last -- and the darkest shadow portions will be more or less faintly seen as a green or grey tone only. This normally occurs in about 4 minutes, but, as will be readily understood, *tanning* must also be complete if the subsequent inking is to be successful, and therefore it is important to make sure that the tanning is complete. With the older type of bromide

papers, having a thicker gelatin layer, this was an easy matter to decide, as the relief was readily seen even at this stage. Nowadays this can sometimes be seen but more often it is necessary to make sure by continuing the bleaching for some little time after the image has become only faintly seen. A time of 8 minutes in the bleacher will not harm the matrix and, indeed, even if that time is exceeded somewhat, no harm will be done. As a general rule it is a good plan to leave the print in the bleacher for a *total* of approximately double the time taken for the image to bleach to a faint tone.

The bleaching operation is a very good guide as to whether the processing of the bromide print has been well carried out and that all is well so far.

If the shadows bleach to a red colour, with the very darkest areas refusing to bleach out at all, it is an indication that either the fixing, or more probably, the washing of the print has not been thorough enough, and although such a matrix may be found to eventually respond to inking it will, at least, give more trouble in doing so.

In more seriously affected cases it will not ink-up satisfactorily at all. The cure for this trouble is obvious!

WASHING AND FIXING

When judged ready, the bleached print should be taken from the dish, and after draining for a second or so, transferred, face up, to a running water wash. This wash will take at least ten minutes, more if necessary to remove the yellow bichromate stain. It is important that this stain is removed as general tanning will follow if bichromate is carried over to the next bath -- the fixing dish.

After a few minutes in the washing water, the matrix should be turned over and kept well under the surface, to prevent formation of air-bells and the washing continued until the stain has gone, that is, the general bichromate stain.

Before the matrix is removed from the wash, the surface and back should be wiped over with a swab of cotton wool, as an extra precaution against carrying bichromate over, and then it can be transferred, face up, to the fixing bath.

Here it should remain for a maximum of five minutes -- *not more* -- during which the dish should be gently rocked, to ensure thorough and even fixing, and then transferred for its final wash, once more to running water.

This final wash does not require to be a long one, half an hour is sufficient, as the silver in the emulsion has now been bleached away, with the result that a slight trace of hypo which may be left in the matrix, will do no harm.

After this wash, the wet matrix should be laid, face up, on a piece of blotting board, and the surface *gently* swabbed with the squeezed out viscose sponge, to remove tear-drops and ensure even drying. Drying should be carried out as before, that is, by hanging the matrix by means of a clip on one corner, and ensuring that it is freely suspended.

When dry, the matrix can be stored ready to be inked up at any time, and can be kept any length of time for this purpose.

BATCH BLEACHING

The treatment of one print only has been dealt with in this description of the bleaching process, but several prints can be dealt with, as a batch. It is important, however, to use fresh bleacher for each print, and it is advisable to lightly pencil an identification number on the backs of the prints to enable them to be passed through the washing, fixing, etc., in the same sequence, and so ensuring that each print receives exactly similar treatment.

It is not advisable to make many in a batch and if more than one print is in the fixing bath at once, care should be taken to keep the prints from sticking together, a precaution which must also be taken during washing.

The matrix will, most probably, show a residual image the colour of which may vary from paper to paper, and in fact, sometimes from batch to batch of the same paper, but providing this faint image is *not* a red colour, or that it does not refuse to bleach out in parts, the indications are that the matrix will ink up readily. On some papers it may not be possible to see any trace of image tone at all after the bleached matrix is dry, and usually, providing the bleaching has occupied sufficient time for the tanning operation to be fully carried out, the inking will be quite satisfactory.

CHAPTER V

Pigmenting Technique

BRUSH ACTION

IT SHOULD be useful and helpful for those readers who have not attempted pigmenting, to give here a description of the different brush actions, and the effects they produce, and by so doing, enable the absolute beginner to practise the actual strokes and to get some idea of the feel of the brushes -- using them without Pigment and on any paper surface.

This should enable the first actual inking to be tackled much more confidently and quickly. There is a tendency for the soaked matrix to dry out rather quickly, which does not greatly matter when the worker knows how to deal with it, but adds to the difficulties of the beginner groping along with a strange technique.

In fact, there are only three forms of brush action, and their use at the appropriate times -- which becomes automatic in the same way that the question of balance becomes automatic to a cyclist -- allows the worker to get any effect desired in the application, and even partial removal, of the pigment.

In all three types of action, the brush is held *vertically* at *right-angles to the matrix* with the toe of the stag-foot uppermost (i.e. away from the worker) and it will usually be found most comfortable to hold the brush about midway along the handle.

***No. 1 action* has the effect of laying on the maximum amount of pigment without contrast, and is carried out as follows: --**

Holding the brush firmly, with the toe touching the matrix

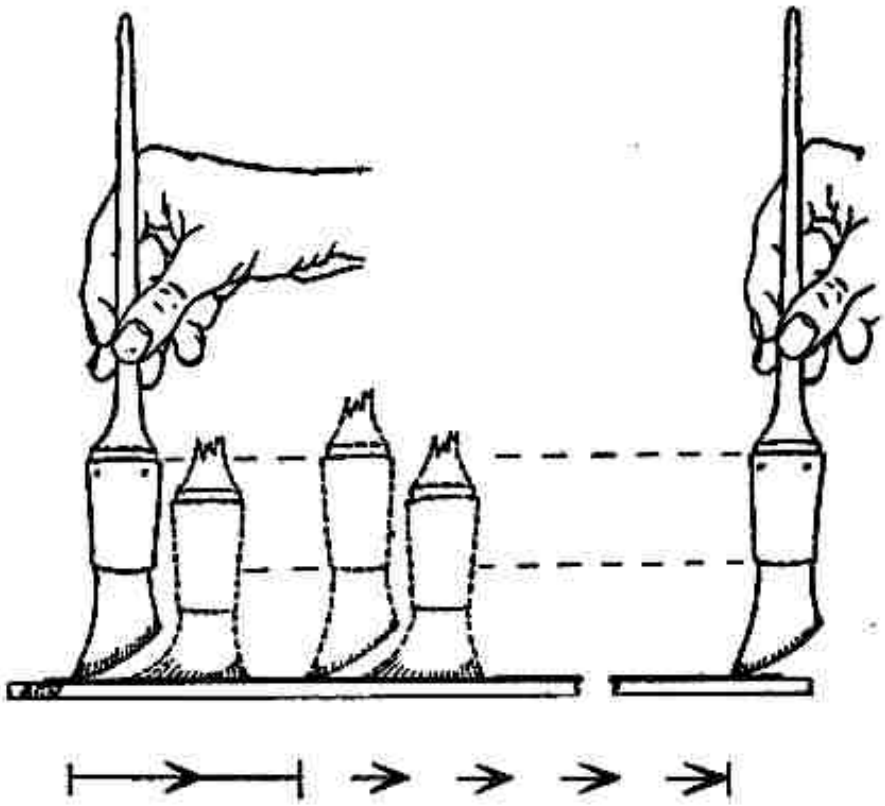


Fig. 5

This shows No. 1 *brush action in which the* toe of the brush never leaves the surface of the matrix. Two ‘strokes’ and the completion of the final ‘stroke’ are shown. The arrowed solid line attempts to show the extent of one 'stroke' -- assisted by drag, at the completion of which the brush will have travelled the full distance of the solid line. The arrowed broken line indicates further similar dragging strokes until the bottom of the matrix is reached.

the brush should be pressed down firmly, until the heel of the brush also touches. This action will spread the brush so that its whole working area is in contact with the gelatin, and then,

with the handle still held firmly, the pressure of the brush on the matrix should be relaxed -- this allows the spring of the bristles to contract the spread of the brush stag-foot until only the toe still remains in contact with the matrix. The brush will have moved slightly towards the worker in this action, leaving a deposit of ink, and the action must be repeated as rapidly as possible, *accompanied by a guiding drag* from top to bottom of the matrix.

The toe, of the stag-foot *must never leave the matrix* when using this stroke, except for recharging the brush with pigment. An attempt to illustrate No. 1 action is shown in Fig. 5.

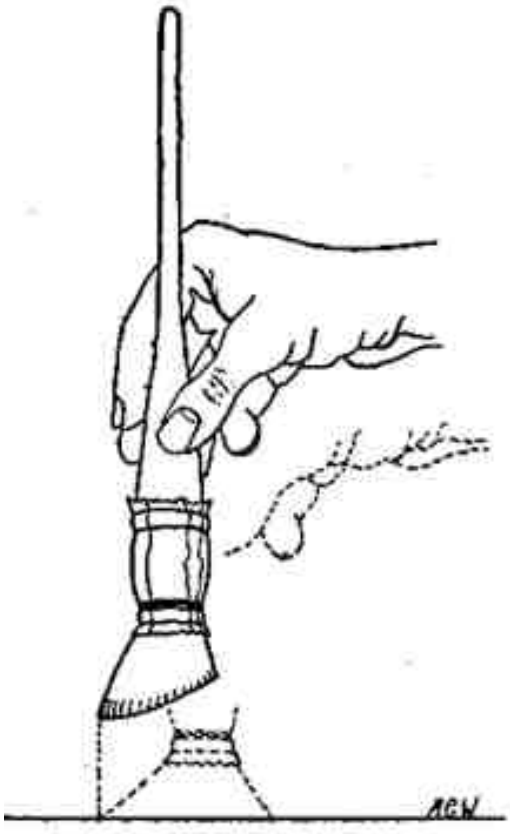
This type of brush action is always used at the outset, to get a moderate amount of pigment quickly over the whole surface, usually starting from the top corner and working down and then repeating in vertical, overlapping lines until the whole surface is covered, roughly but as uniformly as possible, and the quicker this preliminary inking is completed, the better. When once the drag of this 'brush-walking' action is mastered, the whole stroke will become easy.

No. 2 action also lays on pigment when the brush is charged, but it does so with a degree of contrast, and is probably the most used stroke of all. This action is carried out as follows: --

The brush is still held *firmly*, and in the same position as in action No. 1, but now the stroke commences with the toe of the stag-foot, say, one inch from the surface of the matrix, with a gentle pouncing action, allowing the brush hairs to expand until the whole area of the brush is in contact, and then allowing it to spring away *smartly* and return to its original position --1 in. clear of the matrix at the completion of each stroke. There should be no dragging action whatever, and the strokes should be carried out briskly, but gently, with the brush making the strokes separately but close together, in lines to join up and ensure even inking. The only difficulty in making this stroke successfully, lies in the combination of brisk application

Fig. 6

This illustrates the start and finish of one 'stroke' using No. 2 brush action. In this action the brush must be held firmly and there should be no drag at all. Also, after the brush has spread on the matrix it must be smartly returned to the starting position, as shown, by a snatching action.



of the brush, *and a slight check* at the moment of impact to ensure gentleness in application. Also the brush should be assisted in springing away at the end of each stroke, so that it does so smartly, and is, in reality *snatched* away.

No. 2 action is shown in Fig. 6.

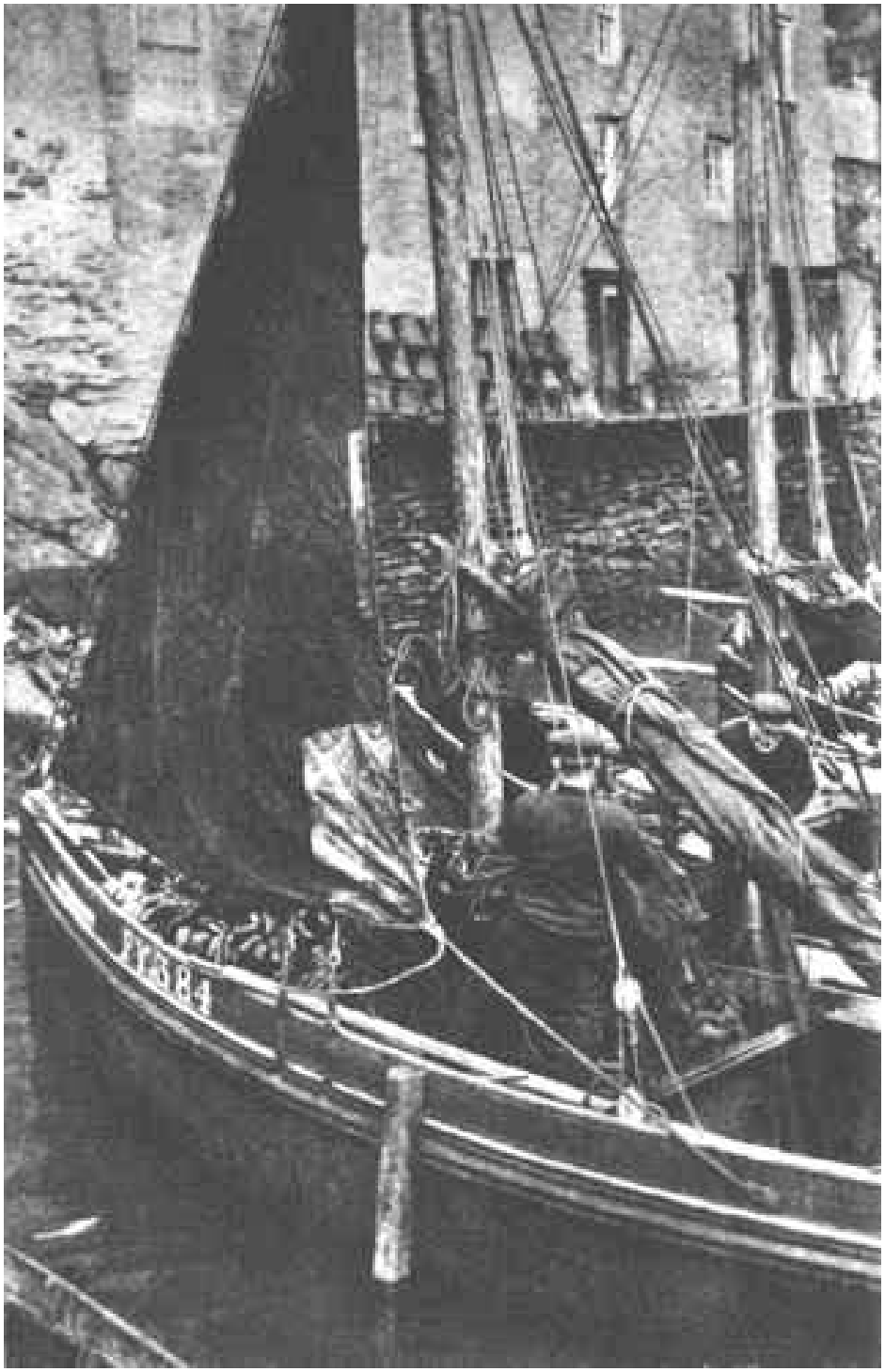
This type of action is used in general inking, with the brush charged with pigment, and is always used also, without recharging the brush, immediately following the preliminary inking which was carried out by means of No. 1 action. Used without recharging, this stroke will remove unwanted ink from the high-lights and add it to the shadow portions. Thus, No. 1 and No. 2 actions can be used more or less alternately and so build up sufficient ink and contrast to ensure a satisfactory result.

QUANTING. Bromoil print on ‘non-bromoil’ chlorobromide paper

MORNING MIST IN THE HARBOUR. Bromoil transfer – on machine-made, linen surfaced paper

EVENING LIGHT. Multiple Transfer – on Whatman 'not' hand-made paper

ON A SURREY HEAT
Bromoil print – inked to give maximum detail and gradation



MENDING THE NETS. Bromoil print

No. 3 action. **This is carried out in precisely the same manner as No. 2 with the exception that with this stroke, the brush is held *loosely* and allowed to slide in the fingers on each stroke. It is a bouncing rather than a pouncing stroke, and the hairs only spread as much as the weight of the brush forces them to when in contact with the matrix.**

This stroke, if commenced, say, 2 in. from the matrix, should be used with caution, but it will produce great contrast and is extremely useful in cleaning up, and the only difficulty in using it lies in keeping the brush vertical and also keeping the toe of the stag-foot pointing away from the worker, as it must always do.

It is a modification of the more dangerous 'hopping' which is not recommended.

While care must be taken when performing No. 3 action at all times, this is especially necessary if it is performed with the heavy Mortimer brush, to avoid damage to the gelatin.

PREPARATION FOR PIGMENTING

Assuming that the print has been made on Kentmere bromoil paper and has been dried and *superdried* as advised -- the crisply dry matrix can be put in to soak.

With Kentmere paper experience has shown that a soaking time of 30 minutes, with a commencing temperature of 90°-95°F, is required. As this is a rather high temperature it is best to insert the matrix, for a few moments in water at a little lower figure -- say 75°F -- and then, after removing the matrix, raise the temperature of the soaking bath to the correct commencing figure and replace the matrix. During the 30-minute soaking period the temperature of the bath will fall steadily to room temperature or thereabouts -- it is not necessary to keep it at the higher figure.

The matrix should be face up, while soaking and, after making sure that it is completely covered, and the surface free

from air-bells, small pledgets of cotton-wool should be placed on it -- near the corners and anywhere else necessary to ensure that it is kept fully covered for the whole of the soaking time.

These cotton-wool pieces do not affect the local absorption of the gelatin -- but they must be perfectly clean and not too tightly compressed. They are best used direct from the cotton-wool roll -- pulled off the latter, and dropped, dry, over the matrix wherever needed.

The soaking temperature for the other papers recommended is somewhat lower, giving best results, in my hands, at 75°F (commencing figure), but may vary slightly from worker to worker, depending upon inking technique.

Meanwhile, the necessary palettes, pigments etc., can be prepared. A hog (Mortimer) and one or more bear-hair brushes will be required, as well as two tile palettes and the palette-knife. One of the tiles should be prepared as a hard ink palette and to do this, a small quantity of hard black or brown pot pigment should be taken, with the point of the knife. This should be placed near the top of the palette, and then a *much smaller quantity* of soft pigment should be taken, from the tube, in the same manner. As a guide, the quantity of hard ink should only be about the size of a small pea, a rid that taken from the tube should be only about one quarter of that amount! The two inks should be thoroughly mixed with each other, to produce a uniform pigment which will be found to be only slightly softer than that direct from the pot. No attempt should be made to spread until the inks are thoroughly and uniformly mixed and this is best done by repeatedly taking up on the knife and pressing down again on the palette.

When correctly mixed, the whole of the pigment should be scraped up on to the knife again and then carefully spread out across the top half of the same palette, to make a horizontal patch at least three inches wide by two inches.

It is essential that this ink patch is extremely thin and to

ensure this, when the patch is fully spread out, the knife should be used to smooth it out and gather up any surplus. This is easily done if the knife is used at a cutting angle, i.e. the whole of one edge of the knife pressed on to the palette, using the flexibility of the knife, at an angle of some 30° from the palette and then passed over the ink patch with this 'cutting edge' of the knife leading. This will, so to speak, shave off any surplus, ridges, or thicker patches of ink, and when done, it will probably be found that the knife has regathered almost half the original total of pigment and that the remainder is spread in a perfectly even and thin patch right across the top half of the palette.

The pigment on the knife may be used later, during pigmenting, either to renew the patch, if necessary, or, mixed with more tube (soft) ink, to prepare a second palette during the final stages of inking.

The plate-glass can be propped up to form a desk angle support for pigmenting, or it may be preferred flat on the table or bench. This is a matter of personal taste and ease in working, but it is helpful to lay a piece of white paper *under* the plate-glass, especially when working with a thin matrix, such as one on Kentmere art paper, which tends to become somewhat translucent after the prolonged soak.

The chamois leather and viscose sponge, both wet and squeezed out, the blotting board being ready to hand and the plastic rubber (or 'plasticine' piece) also available -- and we are ready to commence the actual inking.

PIGMENTING

The soaked matrix should be lifted from the water, by one corner of the safe-edge, and quickly laid, face up on the blotting board but still holding the matrix by its corner. It should then be dragged a little way over the blotting, to remove most of the free water from the back, and then laid, face up, on the

glass pigmenting support. The back of the matrix will still be wet enough for it to adhere to the glass but there will not be enough water on the back to be squeezed out, during brush application, and cause trouble by being picked up on the brush during inking.

The surface of the matrix should now be wiped over with the viscose sponge, which should also remove any water which lies on the glass around the safe edge, and then the whole matrix and surrounding glass should be completely freed from visible water, by wiping carefully with the well wrung-out chamois. This will leave the matrix moist but there will be no 'free' water anywhere. If this were not done, the brush might pick up droplets of water and transfer them over the print during inking, with the result that pigment would be rejected wherever water was deposited. This will be referred to again during the description of inking.

To ensure the complete absence of this trouble, the matrix should be examined by holding it, on its support still, to eye level and looking along the surface. Incidentally, in doing this, it may well be that the relief in the gelatin may be seen either in very slight actual relief or in the form of matt high-lights and with a sheen on the shadow portions. Practice makes this more readily seen, but even if not easily visible it is there, providing the preparation has been correctly carried out.

The hog brush should now be taken up and the whole of the stag-foot surface should be tapped two or three times on the ink patch of the palette. The object is to get a small amount of ink on *all* the tips of the bristles, but, *on the tips only.* To ensure this, the brush should then be immediately tapped on the lower, clean, portion of the same palette, when it will be found that a deposit of stippled ink is left, and if the brush is again applied to the original patch of ink and again tapped on the newly formed deposit, a supplementary patch of pigment is made. This new patch should be renewed from time to time in

the same manner by tapping on the upper patch and depositing more stipple on the lower one. During the ensuing inking the lower patch, only, is used, and the brush should never go direct from the upper patch to the matrix -- but always via the lower one. The foregoing, from the time the matrix leaves the water, should be carried out as quickly as possible, to avoid the moist surface drying too much, but as a little airing off of surface moisture is to advantage, this operation, after a little practice, will just provide sufficient delay in applying the ink, to meet this requirement.

Pigmenting is started with the charged brush applied to the top left-hand corner of the matrix (assuming a right-handed worker!) and overlapping the safe edge, but the brush should not overlap on to the glass support.

No. 1 brush action should be used, as rapidly as possible and immediately the bottom safe edge is reached, the application should be repeated slightly to the right and overlapping to avoid missing any part of the surface. The brush should be recharged as soon as it is noticed that the deposit is getting fainter, and the brush action continued until the bottom right-hand corner is reached. The result of this first rough application should look something like that illustrated in Fig. 2 -- a coarse-grained deposit, showing some form of the image but also some deposit where it is not required, on high-lights and even, possibly, on the safe edge.

Without recharging the brush, **No. 2 brush action should be applied quickly, and if all is well this stroke should clean up the unwanted ink and slightly strengthen the ink deposited on the darker parts (see Fig. 3). If this action, after the practice which was advised, does not clean up, and improve contrast, and especially if it *does not clean up the edges,* etc., too long has been taken in charging the brush and applying the initial inking, and the surface should be re-moistened to the instructions which follow.**

Most probably, however, no such trouble will occur, in which case No. 1 action -- followed by No. 2 , should be re-applied as before, but if necessary, recharging the brush more frequently during the No. 1 action and thus depositing more pigment.

The print will soon be found to have strengthened up considerably but it may not be very bright in contrast and it is much more likely that, by now, the application of the No. 2 stroke is not having so much effect. As mentioned above, this indicates surface drying, and is easily corrected.

The viscose sponge should be re-wetted, partly squeezed out, and the *whole* surface of the print wiped over quickly but gently.

This should be followed *at once,* by wiping the whole surface with the squeezed out chamois.

The effect of this operation will be most marked, and even more so after a quick application of the No. 2 action all over, with the uncharged brush. The contrast of the print will now be greatly increased, the shadows and darker tones will have a heavier deposit and the safe-edge will be quite clean again. (See Fig. 4.)

The above operations, inking and re-moistening can be repeated as often as required, the necessity for and frequency of re-moistening will depend both upon the speed of inking, and also the temperature of the room.

Inking with this hard ink and the hog brush should continue until it is judged that sufficient contrast and depth has been secured. This is really a matter of experience and of personal taste and knowledge must be gained by trial, but it must be borne in mind that softer ink which will subsequently be added to record the high-light detail and improve that of the half-tones, will *also* further greatly strengthen the shadows, and consequently allowance for this must be made in judging when the time has come to cease the application of hard ink, and it must

also be borne in mind that when once work with a softer ink has commenced, hard ink cannot again be used on the same matrix to get additional contrast, and neither can harder ink be applied with a brush which has been used for soft ink, until all trace of the softer ink has been cleaned from it.

Should any spots of free water accidentally appear on the surface of the print at any stage during *inking,* the whole print must be immediately re-moistened in the usual manner, even though this might not have been necessary for any other reason.

If this were not done, and inking was resumed, white or nearly clear spots would appear where the water had been. This will be readily understood when it is considered what the effect of a general re-moistening has on the print. By simply wiping the free water off and then continuing the inking would be like giving the print a local re-moistening and short of retouching and spotting, on the dry print, could not be cured. The general re-moistening does cure the trouble readily and easily.

When the point is reached that it appears to be time to change over to a softer ink it should be found, if the pigment mixture was correct, that while the shadows are approaching somewhere near to an acceptable depth, the half-tones are quite lightly represented and the higher lights hardly represented at all. Before preparing a softer mixture of ink it is always advisable to find the effect of using the same strength ink but applying it with a 'hair' brush in lieu of the hog.

This gives a definitely softer gradation ink deposit and in some cases may be found to be all that is necessary. However, if necessary, softer pigment should be made by adding more soft ink to the amount left on the palette knife. This, when mixed, should be spread exactly as before, and a supplementary working patch of pigment made on the soft ink palette, with the hair brush, which will thus be charged ready.

Meanwhile, the partly inked print will have been drying off

and must be re-moistened in the usual way, but -- and this is of the utmost importance -- before a fully charged brush is applied to a print which has just been re-moistened, at any stage of the inking, an uncharged brush must always be applied -- Nos. 2 or 3 actions, very lightly applied -- to the whole surface. This avoids early clogging of the brushes and also materially assists in preventing clumping of the stipple, which produces an unpleasant and dirty appearance. In the present case the lightly applied No. 2 or 3 stroke would be applied by means of the uncharged hog brush, after which, inking can proceed at once, using the charged hair brush.

From this stage of inking, if brush technique has been mastered it will be found that the matrix becomes amenable, in a remarkable degree, to the three types of brush action. The depth of inking can be lightened here, strengthened there and indeed in practised hands, the matrix becomes almost a palette itself. This is one of the greatest joys of bromoil and the final success or failure of the result lies firmly, now, in the hands of the worker. It will usually be found that at this stage of the inking the pigment is mostly applied by means of the No. 2 brush action, but in certain of the high-lights and particularly in cloud formations, a locally applied No. 1 action, followed at once by a No. 2 or No. 3 stroke, will bring the detail out *and* retain the brilliancy of the highest of the high-lights. This method will normally deposit ink where it is difficult to do so except by greatly softening the ink mixture and the latter is not advisable unless absolutely necessary, due to a tendency of very soft ink to produce 'muddiness' and too fine a texture (or grain) which will not match up with the remainder of the pigmented image.

When softer ink has been applied and the print is nearing a satisfactory completion, any necessary re-moistening must be most carefully carried out by delicate swabbing with the wet viscose sponge or even a swab of cotton-wool and by the very careful removal of free water with the chamois. The softer

ink is much more easily disturbed in this operation and extra care is needed. Also the subsequent uncharged brush operation must be very lightly applied -- with a hair brush -- as a hog brush would most probably be too drastic.

This is also the stage when care should be taken to remove any larger pieces of hair which may have broken off from the hair brush -- new brushes do offend in this respect -- and any of the larger pieces should be removed as soon as they appear. This is easily done by moulding the plastic rubber or plasticine to a fine point and lifting the offending hair away. Small pieces of hair, etc., which are not likely to leave a mark, should be left, as they are easily wiped off the print when it is dry.

The golden rule for the final stage of pigmenting is to work with the hardest ink which will give the desired detail in the high-lights. By doing so, a much richer quality print is assured, whereas, although perhaps easier to work with a softer ink, the result tends to flatness and muddiness. The choice of type of brush used will decide the texture and, to a great extent, the contrast of the final result. The use of a Mortimer brush throughout will give a granular and somewhat more contrasty print. The use of both hog and hair brushes, as described in the details given, will result in a normal result, with a grain as fine as may be required, whereas if a hair brush is used exclusively, the result will be delicate and soft in contrast and having an extremely fine grain. In general, the more brushwork applied, by either type of brush, the more the grain tends to be closed up, and therefore if a really granular effect is required a hog brush must be used, and the minimum amount of brush work applied. This latter can only come with practice.

This description may give the impression that the production of a print of a normal subject in bromoil is a lengthy matter, whereas, in actual fact it is really not so, and neither is it so full of pitfalls as it may seem to be after reading the foregoing instructions.

The writer has deliberately tried to embrace, in the description, all possible errors and points on which he has seen troubles occur but this does not in any way imply that many, or indeed any of them will be met with by the reader.

In most cases, an ordinary common sense approach to the work involved would successfully circumvent most of the errors.

Even at a first attempt an inked-up half or whole plate print should be completed within thirty minutes, while, after a little practice ten to fifteen minutes should be about the average time -- for a normal subject.

DRYING THE BROMOIL

After completion, the print is best pinned to a heavy card or board, by the four corners and suspended, if possible upside down, to protect it from dust, until dry. It should be ready for careful handling within about two days, especially if it is placed in an airing cupboard or similar dry place.

CARE OF THE BRUSHES

Immediately after inking is complete, the brushes, palette, etc., should be cleaned. This should be done, in the case of the brushes, by moistening a lintless rag with petrol or C.T.C. (Carbontetrachloride) and wiping each brush carefully, until the rag is no longer stained. A few minutes later, the paper sheath which is supplied with the brush, should be replaced. This will prevent the brush 'spreading' and helps to preserve the spring of the hairs.

Even the Mortimer type of brush, with which no sheath is supplied, should, in my opinion, be protected in the same way, and I would suggest the making, with cardboard tube or some similar method, sheaths to give the hog hairs the protection they require. At reasonable intervals, both types of brush should be carefully washed in warm soapy water, but this

should only be done when the brushes show signs (by producing dirty stipple, etc.) that they really do require it. Washing can be accomplished by holding the ferrule end of the brush hairs in one hand and rubbing the working ends of the hairs on a piece of good quality household soap which has been wetted in warm water. This will work up a lather which should be carefully worked into the whole brush until, after rinsing in clean tepid or warm water, the brush is thoroughly cleaned. Make sure that all traces of soap are rinsed out, *and do not use detergents* or the special brush cleaners. Surplus water should be shaken out and the protective sheath replaced for a few minutes to settle the hairs in their correct position. Then the sheath may be slid down the handle and the brush put carefully aside to dry, without further disturbance of the hair or bristle.

When thoroughly dry, the sheath should be finally replaced in position.

The palettes should be cleaned by scraping with the palette-knife and all residue of pigment removed finally, from both the palettes and the knife, with an old rag or newspaper moistened with the cleaning liquid in use.

CHAPTER VI

Hints on Control in Pigmenting

SO FAR the completion of only normal inking has been considered and there is very sound reason for the advice given in the Introduction, to leave control strictly alone, until such time as the bromoilist is fully adept at getting the results required. Unless or until this is so, any attempt at more than the most trivial control will be doomed to failure at the outset.

However, a book on bromoil would be far from complete if the questions which arise in the treatment of modifications to tone values, and the like, were not discussed, and advice given. Probably the two items which receive most attention by bromoil workers, and in both of which the process excels, are the improvement of existing sky details, and also the improvement in rendering of the recession of planes -- the latter especially so in these days when the miniature camera reigns supreme!

The improvement in sky detail can be carried out, to a large extent, during inking, but this brush work can be made much simpler by judicious shading while making the original print. The sky portion should be given the extra exposure necessary to bring the cloud detail out as much as possible and in the necessary shading of the foreground this will entail, it will not matter that the fact that the shading has been done will be quite obvious (on the bromide print) by overlap -- dark tips to trees and hedges, etc. Such a print, used as a bromide, and judged by ordinary standards, would be quite intolerable, but during inking of the matrix the faults can he readily corrected by withholding ink partly from the artificially darkened portions

of the foreground, or adding pigment where the shaded portion has extended beyond the desired position, and the worker will have much more chance of rendering the sky detail as desired. If, even with this treatment, clouds are still not strong enough to take the pigment normally, repeated inking with hard ink (the hardest which can be made to take) applied by a combination of Nos. 1 and 2 action and followed by the lightest possible touch using No. 3 will usually produce just what is required after a final application of softer ink, applied by No. 2 action -- very delicately.

The improvement in recession of planes is even simpler and more obvious, and the unsatisfactory pictorial rendering sometimes produced in bromide prints nowadays, frequently due to the combination of all-over-sharpness of the miniature negative *and* the mist cutting qualities of the panchromatic film, can be readily corrected by strengthening the foreground details and, progessively, withholding part of the softer inking from the distant and semi-distant planes, with the result that a more harmonious effect is produced, showing correct aerial perspective including a certain amount of the natural suppression of more distant detail due to the fact that practically only hard ink has been used on the distant planes.

The *texture* must be watched in cases where, for any reason *either* the hard or soft inks are withheld, or a 'hybrid' effect will be produced.

Where soft ink has been withheld from part of the picture, the hard ink only part must be gone over lightly with a hair brush, to close the grain to approximate the grain of the rest of the print, and *vice versa*. Where hard ink is to be withheld, then the soft ink in these parts should be applied, at least in part, by means of a hog brush. It is the omission of such simple precautions as these that is liable to bring discredit on the process from the so-called purists.

Combination Prints are really much more readily dealt with in bromoil, than in the bromide print form for the reason touched upon above, that is that slight overlap -- perhaps due to intricate contours, etc. -- will not cause much trouble and can be made invisible by judicious inking, and withholding. In cases where this would entail too much fine work or parts too small for successful treatment during inking -- apart from using the plastic rubber, which can be used *with caution* to pick up unwanted *small* areas of ink and so reduce the amount of work necessary after the print has been dried -- the best course is to ink on normally, only withholding from the easily manageable portions, and rely on finishing on the dry print, as described in the chapter which deals with that subject. Once again it should be stressed that care in lighting direction, differing contrasts, and such pitfalls should be watched for and corrected by appropriate brush work, when the final matrix is being inked.

Offending items such as awkward tree limbs, telegraph poles and innumerable other discordant features, we wish were not there, can be removed in similar fashion, if large enough, by withholding ink as much as possible, or, on the other hand, if too small for this, then the plastic rubber carefully applied during inking will reduce the amount of after work on the dry print. No attempt should be made to exactly match the surrounding tone by repeated use of the plastic rubber, as this, being sticky, will tend if clumsily or repeatedly used on the same area, to pull up the gelatin, even to the extent of forming a blister and this would most probably spoil the whole print.

A figure can be introduced into a picture which would be improved by so doing, and very definitely, I am of the opinion, that such a figure should be a photographic one and not merely added in, when retouching or finishing.

The introduction thus becomes really a combination print, with only a small section being combined into the whole. In an ordinary bromide print this would be a difficult operation and

the combination would probably show up badly -- unless carried out by means of a copy negative of the cut out figure pasted in position on the main print. Once again watch the shadow direction and other tell-tale details in work such as this -- or else do not attempt it!

Having regard to the large range of colours in which bromoil pigments are available, colour bromoils *can* be made, that is, in more or less full colour, but this work would require great patience in inking, section by section, and thus take many hours to complete. Such a branch of bromoil would also necessitate the worker having a large stock of brushes.

In view of the high level reached nowadays by colour photography -- a level that is still rapidly advancing -- such work would now be more or less outmoded. However some of the past bromoilists have turned out charming work in this medium -- notably the late Fred Usher, some of whose work in colour was outstanding.

An *impression* of colour, on the other hand is in quite another category and is well worth the attention of more advanced workers.

For work such as this, the hard black and hard brown pot pigments could still be used as the basis, and to give the necessary contrast, as pure colour would not be required.

Finally, some subjects lend themselves very well indeed to a simple form of two-tone treatment. A typical case can be quoted, as an example of what is meant, where, say, a single figure or small group of figures, are featured against a 'not-to-fussy' background. The figures can be given extra accent by inking them in, say, hard black followed by brown black tube pigment, with the remainder of the picture inked with hard brown pigment and followed by a warm toned tube ink. This gives a very striking emphasis to the figures which must, of course, be strongly placed -- pictorially.

Whether or not such a rendering is strictly ethical is a matter

of opinion but I like it *if* it is carried out tastefully and well, and on a suitable subject.

To do this it will be found that more brushes are required as a separate hog and bear hair brush must be used for each tone. The brushes for inking the figure may be of smaller size and care must be taken to cut out overlap as much as possible during pigmenting.

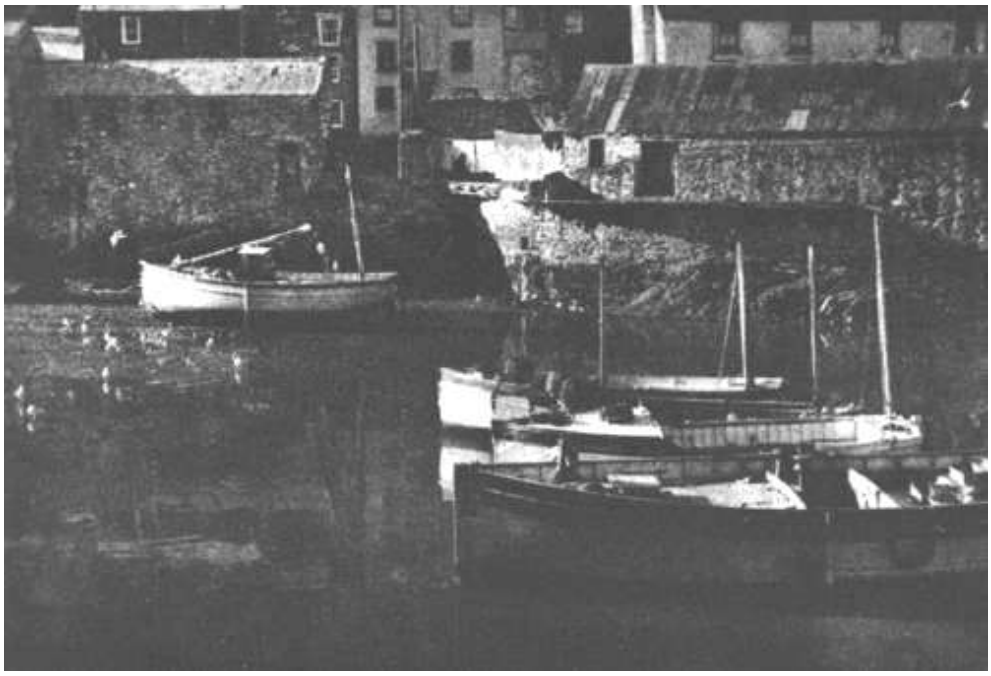
Many other items which might come under the heading of control may occur from time to time, but if the worker has ensured competence in handling the brushes *before* he undertakes anything more than the simple darkening (or *vice versa*) of shadows, he will know how to handle them.

Practice in inking technique will save many wasted prints, and not a little disappointment.

It should be added here that the details given as to modifications in tone values, etc., have all been given from the point of view of landscape, but the same rules in general, apply whether landscape or portraiture is being worked upon.

THE CHALKY PATH. Bromoil -- inked entirely with hard pigment applied throughout for maximum contrast. The negative from which this print was made was, accidently, seriously underdeveloped, and is too weak to give a satisfactory bromide print, even on the most contrasty grade of paper.

THE THAMES AT NORTH WOOLWICH. Multiple Transfer – restrained inking to retain 'pearly' tones.



RECEDING TIDE. Bromoil print.

THE LAST GLEAM. Bromoil print – on 'non bromoil' chlorobromide Paper.

SPRING LANDSCAPE – ASHDOWN FOREST. Bromoil

CHAPTER VII

Finishing the Print

THE INKED PRINT, if it has been put to dry in the advised manner, should be ready to work upon, with careful handling, in the two days mentioned and will be reasonably flat if, as should have been the case, it was pinned down by the corners.

The first stage in finishing is the careful removal of the small hair tips which have been left by the brush action and these usually come away readily if the print is carefully flicked or wiped over, using a soft cloth. This, and indeed the bulk of the work remaining to be done should, preferably be carried out, with the print still pinned to the board, especially as, although the pigment will gradually harden, it will still be quite tender at this stage and the chances of accidental damage will be lessened if it is left in position, while being worked upon.

The work necessary will get progressively less as the worker advances in inking technique, but at first it is as well to be prepared for evening any uneven tones which are due to faulty inking. Especially is this so with the sky portions, and here, should there be a few small areas which appear uneven, these can be corrected if the tones are only slightly different, by working, very lightly, with a well-sharpened lead pencil, using a light touch and working in tiny ticks or stipple to blend in with the adjoining areas. Providing the pencil is not used in such a way as to cause a shiny area, as by repeated strokes on the same spot, it will be found that the extremely small amount of sheen imparted by the pencil work will more or less match the remainder of the inked sky and the retouching will be invisible.

Where there are small patches of darker inking which offend, these can be reduced by the use of the small retouching lancet. On the other hand, if the area is not too small, the finishing rubber may be used. In the latter case care must be taken to ensure that the pigment *is* dry enough, and single strokes with the rubber should be employed, again to prevent altering the existing slight sheen of the pigment. The lancet is used as a scraper and for this purpose should be touched up, at intervals, on an oil stone, to keep the edges keen. Such faults as black specks on the print, representing pin holes or flaws in the negative, are no bother at all on the bromoil print, as a mere touch with the lancet removes them readily and leaves no trace.

Making good parts which have been partly removed during inking (i.e. by partly withholding pigment -- to reduce after work) can be tackled by first correcting any portions which are lighter than the immediate surrounding tones, by the application of a matching colour consisting of the same pigment as used on the print, diluted by paraffin -- to bring it to the same tone. This should be done with a line water colour brush and the diluted pigment should be applied with the brush almost dry, using care to approximately match any visible grain.

Thereafter, the parts which are darker than adjoining tones can be shaved down, with the lancet, to blend in. Carried out carefully, this whole operation will also be quite invisible.

If preferred, water colour can be substituted for the diluted pigment but if so, the special glossy photo-tube colours should be used. These, when diluted with water, will match the slight sheen of the pigment very well, and should be applied in the same manner as described, with an almost dry brush.

As these tube colours are sold primarily for spotting, etc., on ordinary glossy or satin bromide paper, it is quite likely that the reader may have already used them, and will realise their value. They can be bought at any good artists' materials shop.

High-lights which have become somewhat degraded, during the final stage of inking, and remained unnoticed on the wet print may be very noticeable now that the print is dry but this can be corrected easily by employing the finishing rubber -- using single sweeping strokes.

Accentuations **of high-lights can be introduced, if very small, by the use of the lancet, but if the area required to be modified or corrected is large enough, the wedge-shaped point of the finishing rubber is a more suitable instrument. Such work may be desirable on the sunlit edges of cloud formations, if the final inking technique was faulty.**

Worrying details, such as awkward patches of light in woodland scenes, can be filled in with the water colour brush, giving a more harmonious and less spotty picture, with the certain knowledge that, when reasonably well done, the after work will be quite unnoticeable, whereas, the same amount of work on a bromide print would require much more skilful handling, and even so, would most probably be much more readily seen.

Other points in corrections or improvements will occur from time to time, but can be dealt with as they occur, using the basic principles outlined in the foregoing suggestions.

For those who prefer prints with a completely matt surface, and object to the sheen which occurs sometimes in the deepest shadow portions of bromoils -- even though this characteristic adds richness to the result, may prefer to 'defat' their bromoils.

This is done in the following manner. A good depth of C.T.C. is poured into a dish larger than the print and the latter, which ***must be dry*** **(this operation must never be carried out until the day** ***after*** **inking the print) should be carefully and gently slid under the surface and kept under by means of the safe edge. As soon as the print enters the C.T.C. a sizzling sound will be heard as the fat in the pigment is being dispelled. The print should be kept in the defatting bath until this sound stops and after lifting out by a corner of the safe edge it can be**

laid on a blotting board or hung up until the C.T.C. has evaporated from it. There are some dangers in this operation as anything touching the inked surface while in the C.T.C. or until the print has dried off, will ruin it. The print must lie still, under the surface of the C.T.C. and the dish must *not* be rocked.

A print intended for 'defatting' should be made stronger in contrast as the loss of the shadow richness, as is the case with all dead-matt surfaces, does tend to reduce the contrast. However, the defatted print, after drying off, has a beautiful dead-matt surface, and any retouching can he carried out by chalk type pencils or non-glossy water-colours and the dry print is more robust and less easily damaged than the ordinary finish bromoil.

When all the after work has been carried out satisfactorily, the question of mounting will arise and while this question is largely a matter of taste, it is advisable, if the bromoil is intended for keeping loose in a portfolio, that it should be mounted behind a cutout opening. This does not necessarily apply to bromoil transfers, which are quite immune from abrasions, but the cut out does give extra protection for the surface of a bromoil. An alternative is to mount the bromoil on the surface of an ordinary mounting board with a loose sheet of smooth tissue, the glassine variety is excellent for this, attached to the top back edge of the mount and folded over the front so as to cover it. It can then be folded back at any time for viewing the bromoil.

Protected by either of these methods, the surface of the bromoil will be perfectly safe for storing or handling.

If mounted in a cut out, and provided the safe edge is wide enough, it is a good plan to arrange an opening large enough to show a surround of safe-edge, which latter can also carry the title, etc., as is customary with engravings, etchings, and the like.

Transfers can be mounted similarly, but as they are completely robust, due mainly to the absence of the gelatin layer,

the simplest way, and probably the most effective, is to make the transfer on considerably larger paper and so dispense with the necessity of any mount. No tissue protection is necessary in the case of transfers.

Both bromoils and transfers may be dry mounted quite safely providing the ink is dry, but in the case of bromoils it is not wise to dry mount until three to four days after inking, at the earliest.

CHAPTER VIII

Unnecessary Faults

THE TITLE of this chapter has been deliberately chosen, as, if the processing instructions, *and warnings,* already stressed, have been carefully followed, the faults and troubles detailed should not occur, but, if they do, the fault can safely be assumed to lie with the worker himself.

In the case of a beginner, faults will most probably be due to a natural keenness to produce results, with a consequential carelessness at some point in the preparation of the matrix. This, while being quite excusable is unfortunate as it is certain that such a happening is liable to discourage, to some degree at least, even the keenest, especially if he cannot at once see the reason for his failure.

It is just for this reason that the notes which follow have been written, even though they will largely duplicate instructions and warnings given in earlier chapters. Rightly or wrongly, the writer has taken the view that it is better, if anything, to overstress the possible difficulties, even to the extent of implying greater difficulties than actually exist, rather than to gloss over even the simplest of pitfalls, and so leave the less experienced worker floundering into inevitable discouragement !

Processing, right up to the matrix stage, is as simple as any photographic process can be. The big difference between carelessness in bromoil processing and that for ordinary bromide or chlorobromide printing, is that while contamination, faulty washing or fixing will not show up *immediately* in a bromide print, it will, in the case of bromoil, almost certainly show itself while the matrix is being inked.

It will be readily understood, too, that the diagnosis of faults cannot be more than a guide, but at least, the suggestions put forward should be of assistance to the worker by leading him to the *probable* cause of any trouble, and from there the solution is in his own hands!

Stress must, once again, be laid on the advisability of patient and methodical processing, and also the need to keep a permanent check on the dishes used. If there is the slightest doubt about the chemical cleanliness of the latter it would be far wiser to use only porcelain dishes throughout, and to mark them so as to ensure each dish being used for one type of solution, *and for that type only.* By doing this, the bromoilist will have gone a long way towards prevention of troubles -- after all, prevention is better than cure!

CIRCULAR OR REGULAR SHAPED PATCHES. These are usually caused by air-bells or bubbles, most probably in the fixing bath (first or second) or during washing, and the patches will only partly accept ink. If the patches are blurred or have a soft outline, the cause is probably due to the prints being allowed to adhere to the dish, or to each other during fixing, or even more probably, during washing.

These faults are not difficult to cure--in future, but, unless they are minor in size, and capable of correction by additional local inking, it is wiser to abandon the print, but only doing so after completing the pigmenting, in case, as is possible in milder forms, the trouble corrects itself.

On the other hand, if similar patches, regular in shape, show a tendency to ink up *darker,* it is clearly a case of air-bells, or prints sticking together or to the dish, during the final soak for inking. This can usually be corrected by continuing the soak for a further, full soaking time, by which time the patches will disappear on the application of a few, locally applied strokes of the uncharged brush, using No. 3 action. If any traces still

persist very slight lancet scraping, on the dry print, will put matters right.

IRREGULAR SHAPED PATCHES. Where these are of large size, particularly, and only show up when the print is being inked, the indication is that either the developer or the bleacher (more likely the former) was not poured over the print quickly and completely.

Apart from the point that during inking, slight differences of tone in adjoining areas may be avoided, by judicious brush-work, there is no cure for this trouble.

COLOURED PATCHES AND MARKINGS. If parts of the shadow portions turn red or red-brown in the bleacher, this definitely points to faulty washing or incomplete fixing of the *bromide* print, or even to both these causes.

In most cases, prints which have been incorrectly prepared in this manner will also refuse to bleach out as completely as they should do, especially in the darker parts of the shadow portions. This is due to traces of the products of the fixing bath, still present in the gelatin, combining with the bleacher, and exhausting it, so that it fails to bleach the heaviest parts and, even more importantly, it fails in its tanning function. Such a matrix is almost certainly doomed to failure. In cases where the hypo products are present only to a lesser extent, the general colour of the bleached image will incline more away from the normal green or greyish, towards a reddish-brown, more or less evenly, and including the shadow portions. Such a matrix will probably work and give a reasonably good result when eventually inked, but it will, in all probability, give a good deal more trouble in pigmenting as it is likely to take the ink, only reluctantly.

OTHER MARKS. Marks and blemishes, which are not part of the image, and which only appear *during* inking, are almost

certainly due to contamination during processing. These may take several forms, such as smudge-like marks, or streaks, and if the worker takes the trouble to really carefully check his processing routine, it is more than likely that he will find that they are caused by splashes or drips, from one bath into another. If small, they can probably be removed by means of the retouching lancet, on the dry print, or a combination of the plastic rubber during inking, finishing off with the lancet when dry. Their *prevention* is obvious, when the exact cause is traced.

A final warning regarding processing troubles, concerns the developer. Amidol is not so universally used nowadays, as it was some years ago, and therefore new users should bear in mind that this developer should never, under any circumstances, be mixed (or weighed) in the darkroom. The Amidol crystals are extremely light in weight and as a result, it has a tendency to float, and finally settle on dishes, paper, etc. If this happens brown specks and streaks will appear, and when on the face or back of prints they will not wash out.

These are readily seen, of course, and unless they occur in heavy shadow areas, they will not be hidden by the inking. This trouble will be well-known to older workers.

DIFFICULTIES IN INKING. If the matrix shows pronounced slowness in taking the pigment, in relation to the image, one of two faults is indicated. The more serious of the two is *general tanning*, in which case the chance of getting a worth-while result is remote and it would be advisable to abandon the attempt and find the cause. This could be the darkroom lamp, as already mentioned, with emphasis, in Chap. I, or chemical contamination In either case the matrix will take little, if any, ink and if any is forced on, it will return to the brush the moment the brush touches it again. The second cause could be *undersoaking*, which is easily corrected.

In this case the symptoms are slowness in taking ink, but ink deposited will remain and not respond to the No. 2 stroke. Any ink accepted will only be with extreme lack of contrast, even after No. 2 or No. 3 strokes. In this case the matrix should be returned to the soaking bath.

In such a case, when brush work is resumed, it should be by using the No. 2 action with an uncharged brush first, as the additional soak will have loosened any pigment accepted where it should not have been, and this stroke will put a good proportion of this free ink on to the darker shadows, with the result that the print will commence to show normal contrast. From the foregoing it will be realised that, providing the matrix had only received the first general inking, when the trouble was realised, there will be no necessity to clean the pigment off before continuing the soak, but if, on the other hand, the worker has, hopefully, put more than the initial ink layer on, then it would be wiser, in order to save clogging the brushes, to clean the pigment off before resoaking.

To do this, a wad of cotton-wool should be moistened with C.T.C. and the surface ink removed with this.

Good quality petrol may be used if carbontetrachloride is not available. When the solvent has fully evaporated from the matrix, *but not before,* resoaking can be continued.

In the case of a beginner, this under soaking must not be confused with incorrect brush action, which latter, if the No. 2 stroke is not properly done, will produce similar results.

The question *of over soaking* is practically non-existent now, although it was a most troublesome matter in the days of the special bromoil emulsions, which required a considerably lower soaking temperature and for a shorter time.

In the case of over soaking, contrary to advice frequently given, there was no real cure, as, by drying and resoaking at a lower temperature, as many well-known workers advised, the trouble could not be corrected. It has been proved that an

overswollen gelatin would at once return to the same state after drying and resoaking at *any* lower temperature. This fact is used in the technique for working with 'supercoated' papers. Occasionally, small tear-drops, if left on the matrix when it is hung up for final drying, may cause white or light spots when the print is being inked. This is actually a local form of differential swelling (it would be a case of overswelling if it had taken place on one of the original types of special bromoil papers!) as the tear-drops really continue to swell the gelatin where they occur, while the rest of the matrix is drying, and this trouble is most likely to occur if the drying is taking place in a warm position. Tear-drops should always be removed, but if this trouble does occur, a little pigment applied with a small detail brush after the main inking is complete, or even on the dry print as a retouch will usually put matters right.

While none of the above troubles should, theoretically occur, if the processing has been carried out conscientiously, it will be found, in fact, that the worker will never be bothered with more than one, or two of the difficulties at most, and it is hoped that these notes will be the means of guiding him to recognise, and cure, these.

If so, the necessary repetition will have been worth the effort in reading!

CHAPTER IX

The Transfer Process

THE ULTIMATE aim of every bromoil worker should be, without doubt, to produce the distinctive prints made possible by the use of the transfer process. When once. he has mastered the brush and processing technique of bromoil, transfer offers no further difficulties and is as easy to work as bromoil itself.

But what an additional prospect it offers to the worker!

First and foremost comes the advantage of the complete absence of the gelatin layer in the final result, which ensures absolute permanency as the print, on completion, will consist only of the chosen paper and pure pigment, without any possibility of chemical remains to cause trouble in years to come. In addition the transfer may be made on any, or almost any, desired paper, from the heaviest Whatman through a whole range of other beautiful hand-made papers, plate papers, Ingres and Van Gelder papers and delicate and fascinating Japanese tissues, all of which have their individual qualities and charm.

Prints thus produced are just as permanent as the chosen paper allows, and in fact the finished print can be put on level terms, in many ways, with an etching or engraving.

The materials in these types of prints can be identical in all respects. The only difference being that the transfer is of photographic origin and has almost 'continuous' instead of 'line' tone. A fine grain transfer will appear to have continuous tone but, in fact it has, of course, a stipple as in the case of bromoil.

Another advantage of this process lies in the fact that, after a transfer has been made, the matrix can be cleaned (with

C.T.C. or petrol) and stored, for making further transfers, at any time. While it must be stressed that the transfers thus produced from one matrix will not be exact duplicates, in the same way that bromoils cannot be precisely repeated, it is nevertheless advantageous and especially so in the case of a matrix from a combination print or from a print which has demanded much work or effort in the making.

While bromoil itself gives scope for a good deal of 'control' which can be quite simply carried out, even more scope is in the hands of the transfer worker.

The matrix for transfer is produced in the same manner as for bromoil with the exception that for transfer the negative must be reversed in the enlarger carrier, to give a reversed print -- left to right and the print must also be made a little lighter than for bromoil, and with somewhat more contrast. Details of these slight differences in the preparation of the print will be given later in this chapter, but first it must be said that no new brush technique has to be mastered and apart from the fact that a Transfer Press must be obtained, and a supply of 'final support' paper also, no other additional material or equipment is required at all.

THE PRESS

It should be stated, at once, that in considering the question of a transfer press, the worker should put out of his mind entirely, any thought of using a domestic rubber roller mangle for this work. Such a press will just not do, as it does not exert nearly enough pressure and nothing can make it do so, while the old-fashioned 'letter-press' is even worse. In this latter case the pressure exerted, is dispersed over the whole area and is, therefore, negligible at any one point. A press for bromoil transfer must give heavy pressure in line contact only.

It has been stated in some quarters that a wooden roller-mangle *can be* used for the process, but I personally have never

had the opportunity, or the inclination, to try one, and, as this type now is surely almost extinct, it would appear that any idea of finding one as a cheap substitute for a genuine press should be dismissed as impracticable, especially as most of those putting the idea forward state that 'the rollers must be in first-class condition' and that such a one 'will make a fairly efficient press'! Surely it would be better to concentrate on getting a press which *is known* to be suitable for the work it will be called upon to do?

There are two main types available. The best is, undoubtedly, the Sinclair Bromoil Press, which is specially made for the purpose, and is so accurate and easy to adjust for varying pressures, as the two heavy steel rollers are always accurately parallel to each other and controlled for even pressure, along their whole length of 20 in. by the operation of one hand-wheel. It requires no printers' blanket.

The other type available is one of the many makes and forms of etchers' presses. This type has, usually, a moving solid base plate which passes back and forth under a single roller. The disadvantage with this type is that adjustment of pressure has to be carried out at each end of the roller and also, it does require a printers' blanket, in use.

Both types are first-class in the results they produce, but it should be borne in mind that both were designed for their own specific purpose. If cost is of primary importance the etchers' press will, of necessity, be decided upon, as such a type is, especially in the smaller sizes, cheaper than the bromoil press and also it is, it appears, perhaps easier to obtain second-hand, if required. It is also made in several sizes.

The Sinclair Press, on the other hand is far quicker and easier to use for our purpose,. especially so as the adjustment of pressure can be altered, in a matter of moments by the simple movement of the hand-wheel control, by a few degrees, if necessary. It will take large work, as the rollers are 20 in.

long, and in spite of their length the pressure is always precise and accurate along the whole of their length. Operation, too, is easier with this press, as the complete 'sandwich' is passed through the rollers, steadily and easily, without the risk of stopping midway (which would be fatal for the matrix) by means of a long leverage handle. With the etchers' press, operation is by means, usually, of a four-pointed capstan-type hand-wheel.

The Sinclair Press is supplied with a pair of full-size zinc sheets, which are riveted together at one end and only require a pair of blotting boards to complete the 'sandwich'.

THE PRINT

As already mentioned the print intended for transfer should usually be reversed, so that when completed, the transfer will be the correct way round. This is essential in the case of portraits and pictures of definite localities of course, but in purely pictorial work it can be imagined that the reversal for a final transfer may not be necessary or desirable -- the choice is entirely with the worker, and a matter of taste. All other operations in making the print are exactly as if it were to be inked up as a bromoil, except that when intended for transfer, it must be somewhat less heavy and also more contrasty.

This is easily arranged by modifications to the dilution of the developer, the printing time, and, if necessary, by the development time.

It is advisable to use the developer made up as described in Chapter III but with the water reduced to 15 or even 10 oz. – the latter only if the negative is rather soft or flat. With this concentration of developer, and the developing time either remaining at 2 minutes, or (again when dealing with a soft negative) increased to $2^1/_2$ minutes a print should be produced which will be considerably more contrasty than if intended for ordinary bromoil inking. This will automatically ensure that

the high-lights have less tone than in the case of a print for bromoil, and, indeed the accents of the high-lights will be practically without tone at all. It will be found that a somewhat shortened exposure of the bromide paper will be necessary to produce a print having these characteristics and that the print will be almost developed to finality.

All the remaining stages of processing are carried out exactly as for a bromoil print, including the bleaching and also the drying *and the superdrying*, and just before soaking for pigmenting, the matrix should have the safe edge trimmed off.

Great care should be taken in doing this, as it is frequently difficult to see where to trim to, on a fully bleached matrix.

If a little of the safe edge is accidentally left on, it may only become visible during inking and it is then too late to trim without risk of damage, but a little left on will be rather ugly on the completed transfer. After removal of the safe-edge the matrix must be handled with extra care as the surface, even at the corners, should still not be touched. There is a knack in doing this, which, although difficult to describe, will soon be acquired.

The soaking and inking technique remains unaltered from that used in bromoil, but, after the preliminary inking, it may well be found that the No.1 brush action is used less frequently, the great bulk of the work being carried out by Nos. 2 and 3 strokes.

TRANSFERRING

For the purpose of this description it is assumed that the worker is using the Sinclair type press, but if not, the necessary modifications to the instructions can readily be substituted, having regard to the method of pressure adjustment, form of sandwich, etc., applicable to his press.

While other papers will be discussed later, it is also assumed

PEACE. Bromoil print from two negatives. Sky printed in separately. Unwanted animals, bushes, etc., removed – during and after inking

THE STILLNESS OF SUMMER. Bromoil transfer – on machine-made, linen surfaced paper.

LANSALLOS BAY. Bromoil print.

CRABBERS. Bromoil print.

that, for the final support paper, a medium weight Whatman 'not' paper has also been chosen for use.

This is an easy paper to manage and does not require damping.

A spare piece is required, of the same weight as that which will be used for the final print, on which the stretching pull will be made, but this piece can be used, repeatedly, and will only need to be replaced when it has become very heavily covered with ink.

The method of transferring is to make a 'sandwich' which will consist of the inked matrix, correctly placed, face down, on the sheet of the final support paper chosen, and these, in turn, are placed, matrix uppermost, on a large sheet of blotting board. Finally a further similar sheet of blotting is laid on top to form the pack. Care must be taken that the 'leading' and 'following' edges of the blotting boards do not coincide, as the pack must present a series of steps as it passes through the heavy pressure of the rollers. Also the blotting boards must be larger than the final support paper, and the latter (with the matrix in position) must be contained *within the edges of both* blotting boards.

The pack should now be placed carefully, to avoid moving the matrix, between the zinc sheets, to complete the sandwich.

In transferring, the sandwich is passed through the press, and back, at a moderate pressure. The speed at which it travels through, as well as the degree of pressure, affects the amount of ink transferred, and the pressure must, of necessity, be a matter for experiment. No more than a rough guide can be given here, but if the sandwich passes through the rollers at a speed of about 1 in. per second, as it should, and the pressure is such that each 'step' of the pack can be distinctly felt, as extra resistance to the handle operation as it enters the rollers, and vice versa, then the pressure will be about correct for most papers, and for maximum transference of ink.

The above will give, at least, a little guidance at the commencement, but experience will soon be gained, and it will be found that the *lightest* pressure should be used, which will transfer the ink, and this is largely dependent on the brush technique of the worker, as referred to later.

It is strongly recommended that a dummy sandwich is prepared, by making up a pack, consisting of a pair of blotting boards with papers inside of similar thickness to the final support and matrix, and with this pack inside the zinc sheets, a good idea of the effort required, and the general feel of the press operation, will be gained by practice runs through the rollers.

The passage of the sandwich through the press and back (when actually transferring) must be at as uniform a speed as possible, and *its travel must not stop, under any circumstances, even for a second, while any part of the matrix is between the rollers.* Should it do so, the matrix will be completely ruined, as the line of contact will leave a permanent impression on the moist gelatin, which it is impossible to remove, and which would show up badly if further inking were attempted on it.

STRETCHING PULL

Only the hard ink-palette should be used in inking for the stretching pull, and for this the matrix should be on the glass support, with surface water removed, in the usual way. The object is to get a small amount of ink all over the matrix, as quickly as possible, and this should be done with a lightly applied No. 1 brush action.

When completed, a lightly applied No. 2 action should immediately follow and this will remove surplus ink and clean the matrix up. It will also serve as an indication that all is well as regards ink acceptance.

The matrix is now ready for the stretching pull, after the removal of all visible broken hairs, etc., from its surface. It is important to ensure that there are no pieces of hair or fluff on

the gelatin surface, as, if left on, the pressure of the press would embed them in the gelatin, and they would leave marks on future transfers.

Pressure of the press should be slightly increased for the stretching pull, and the amount of the adjustment alteration noted, so that the adjusting wheel can be returned to the original position, after this pull has been made.

The matrix should now be laid carefully on the spare piece of Whatman paper, and the pack made up as described and inserted between the zinc sheets. This sandwich should now be passed through the press and back, at about the speed suggested, and after this has been done, the pack should be carefully removed. It should be found that almost all the ink has been transferred from the matrix on to the piece of Whatman, which latter can be used again and again for stretching pulls for future transfer work.

There will be found to be a slight impression of the shape of the matrix, on the Whatman paper.

INKING FOR TRANSFER

The matrix should be returned to the soaking bath for a minute or two, after which, inking can be recommenced, but this time *for transferring* as a finished print.

While the matrix is resoaking, the pressure on the press should be returned to the original position of the hand-wheel. The most important consideration in inking for transfer is that it must be carried out as lightly as possible, without pounding the ink into the gelatin, and at the same time keeping the resulting print bright and contrasty. It will be found that, even the smallest amount of pigment on the high-lights will transfer completely, whereas the shadow portions of the matrix will not part with all the ink.

This means that, unless due precautions are taken the transfer will prove to be surprisingly flat and muddy. To guard

against this, inking must be carried out so that the matrix, when fully inked, looks extremely bright and contrasty, and it will be found that, to attain this, most of the brush work will be carried out by means of the Nos. 2 and 3 actions, and the viscose sponge and chamois are used more frequently than when ordinary bromoil inking is being done. It will not be found necessary to soften the ink greatly, if at all, in getting the effect required, and when the inking is completed and the hairs and blemishes have been removed by carefully lifting from the surface with the plastic rubber (or plasticine), the matrix is ready for transferring. This time, the chosen support paper is used, of course, and the sandwich made up as described, anti it must be remembered that the matrix should go through the press in the same directions (back and forth) as it did when being stretched, not at right-angles.

The sandwich is then passed through the press and back, and now it is important that the position of the matrix on the final support is not disturbed in opening the pack. Before it is disturbed the matrix should be marked for re-registration, and to ensure this, a line should be drawn, with a sharply-pointed pencil at 45° across each corner of the matrix. The lines should extend, at both ends, on to the final support paper. This will enable the matrix to be replaced exactly in position should it be found that a further 'pull' or 'pulls' are necessary. The matrix can then be removed from the transfer and after doing so, the transfer should be carefully examined, both to ensure that the pigment has transferred satisfactorily, and if, on the other hand further inking, in whole or part would improve matters. If the latter is decided upon the matrix can, after a quick resoak, be inked up again as required and when judged ready and after again making sure that all hairs, etc., have been removed, the matrix can be placed precisely in position on the transfer, and once more passed through the press. This operation can be repeated until the result is considered satisfactory.

The main point to guard against when partial re-inking is to be transferred, is to make very certain that no deposit of ink is left on the matrix where it is not required, and to ensure a very thorough clean up, by a No. 3 brush action, before re-transferring.

This will avoid the accidental over-inking of parts not requiring additional tone, and it should always be remembered that pigment can always be *added* to a transfer, but not *reduced!*

By means of this method of multiple transfer great contrast can be built up, by repeated inking and transferring, parts of the matrix only, and it will be realised that the process offers almost unlimited scope, even more freedom of expression and tone control, than bromoil itself.

It should be specially pointed out that where an etching press is being used, necessitating the use of printers' blanket, the transfer may have to be made by passing the sandwich through the press and straight out, that is not through and back again, to avoid creep or shifting of the matrix on the final support before the re-registration marks have been added. Otherwise re-registration might well be impossible, and therefore multiple transfer could not be carried out.

FINISHING

The finishing of the transfer can be carried out quite soon after the print is made, and it is perfectly safe to do so on the following day when the transfer may be handled quite freely. After-work can be by the same means as in the case of a bromoil print except that where pencils are used, they must be of the chalk type, without shine, as the transfer image is normally quite matt. The lancet also, will not be frequently used as any removal of unwanted pigment is better, and more simply done by means of the finishing rubber.

Mounting can be dispensed with the transfer being on a sheet of selected paper is probably more attractive without

one but, if preferred, a cut-out mount is another satisfactory way of finishing, leaving a wide margin of the final support paper showing round the actual picture. No provision is necessary for protecting the surface as a transfer is as robust as an engraving or etching and is not easily damaged.

PAPERS

With modern bromide emulsions, which are definitely harder and less sticky than was the case with the withdrawn special bromoil papers, it is not now necessary to damp most types of final support papers. It is still advisable to damp some papers, however, partly to effect improvement in ink acceptance in addition to avoiding any possibility of the matrix sticking.

Those papers which should still be damped are the Whatman and other types of 'hot pressed' surface papers, and also the 'plate' and others with sized surfaces.

As the finished appearance of the transfer is affected by the question of whether to damp or not, it is largely a matter for the taste of the worker.

Van Gelder and Ingres papers can also be damped, but I personally prefer not to damp the Whatman type 'not' surfaced papers. There is definitely no need to do so and the ink acceptance by the dry paper is excellent.

Damped papers take the ink very readily usually, but give slightly softer contrast than if used dry. The decision can mainly be left to the worker's taste, therefore, and to the contrast required.

Damping does also help to make re-registration more sure, in the cast of multi-transfer, as the support paper and the matrix are more likely to expand uniformly in the pressure of the press. Before giving details of the method of damping it might be helpful to mention some further suitable papers.

In the Whatman type, in addition to the *Hot Pressed* and *Not* surfaces, there is also the *Rough* -- both white and toned.

These are used exactly as is the *Not* surface, and can be used dry. This type embraces, in addition to actual Whatman papers by many other makers. Among the heaviest weight papers of all there are Green's 'pasteless board' series, which are exceedingly suitable and behave exactly as does Whatman *Not.*

The Japanese tissues in many weights and textures are very fascinating but in my opinion have, very largely, only a specialised application. Almost without exception these papers must, of necessity, be used dry, indeed some of the most delicate are actually water soluble and even when used dry they have to be separated, from the matrix, with great care to prevent damage due to excessive sticking during transfer. A precaution can be taken against this happening, by *lightly* spraying the tissue with pure spirit of turpentine some 5 to 10 minutes before transferring. An extremely light, mist-like spraying, is all that is required and this is probably best carried out by means of a simple spray diffuser, of the type supplied for use with artists' fixative.

Finally there are innumerable types of machine-made papers and cards, in many textures and surfaces but I feel that the hand-made Whatman type of paper, beautiful in itself also has the inestimable advantage of resistance to ageing, which the machine-made papers do not appear to have.

DAMPING

To damp the final support paper, the sheet or sheets should be soaked, by being fully immersed in cold water, for about five minutes and this should be done about an hour before it is required for use.

After soaking, it should be lightly blotted off and then kept between sheets of blotting paper until required for use.

It will be in the correct condition in three-quarters to one hour after soaking.

CHAPTER X

The Use of Supercoated Papers

IN VIEW of the comparative ease with which the papers mentioned in Chapter I can be used for bromoil and transfer, it may appear to be quite unnecessary to even consider the question of using the more difficult supercoated papers for the process. However, the reader should never lose sight of the fact that, had this attitude been adopted by all the older bromoilists, the process would have been abandoned long ago and become merely a historically interesting one, instead of occupying the interests of so many and being so well represented in major exhibitions, as it is today.

Paper manufacturers are, after all, in the hands, very largely, of public demand, and even more so of the demands of the trade printing and processing houses and, therefore, their policy is dictated solely by the demands of their own research departments -- and economics! On that account, new and improved quality papers appear from time to time and it is highly possible that among papers yet to appear, or modifications to existing papers, emulsions may be found tailor-made for the bromoil enthusiast in the same way that the Kentmere papers, which were not, by the way, originally made specially for bromoil, are now.

Fortunately the process is such a fascinating one, and its devotees keen enough to be constantly on the watch for such eventualities that the chances of a suitable paper slipping, *unnoticed,* onto the market, is quite remote.

Unless, and until, the paper manufacturers find an alternative emulsion to the gelatino-silver one for universal use, which

it is sincerely to be hoped *never* happens, bromoil will continue to occupy the interests and activities of so many.

It is for that reason that I feel this handbook would be incomplete without some guidance on the general differences between the processing of supercoated papers and the easier non-supercoated types.

Since putting forward a method of dealing with supercoated bromide and chlorobromide papers some years ago, little has occurred to alter the *general principles* of those methods, except the matter of present-day paper surfaces.

As already stated, the ideal is a surface as near as possible to the largely discontinued Royal type -- which was extremely popular for so many years, but which appears to have been largely superseded by most makers -- why I do not know, by a vast array of lustres and grained satins.

However, we must realise the fact that, at present at least, we are faced with a choice of surfaces, suitable for bromoil, only among the matt and near-matt, as the lustres and more glazed surfaces just will not accept ink which will stay on. On the other hand, a paper with a slight sheen is preferable to one having a really dead-matt surface.

The insensitive supercoating layer obviously interferes with the action of the tanning bath and allowance must be made for that, especially in order that the half tones and lighter parts may be inked up satisfactorily, and, for the same reason the soft grade and not the normal contrast, should always be chosen, except in cases where the normal grade is known to produce soft results, as is sometimes the case.

Paradoxically enough, a paper which is known to work (and which I have used -- experimentally) will be mentioned here and although it is not supercoated, it is so considerably hardened that it must be treated as though it were. It is also of the normal grade! This paper is Gevaert 'Gevatone K29N' and

is. of course, a chlorobromide -- unfortunately with a *dead-matt* surface, without any suspicion of sheen. In spite of its supposed disadvantages, judged by the foregoing statements, it does work well, when once its inking technique is mastered. Although normal it is of soft gradation and processing should be exactly as for a supercoated paper, details of which follow.

PRINTING AND DEVELOPING

The same bromoil-type of negative is quite suitable but the exposure should be so arranged that by developing for $2^{1}/_{2}$ minutes the print should be definitely stronger than if made on bromoil paper, but it must also be heavier. This will mean that the high-lights must have a heavier tone; consequently the half-tones will also be darker and the shadows should be nearer to the true black of a straight bromide print.

The darkening of the print in half-tones and high-lights will partly counteract the effect of the supercoat layer on the tanning action later. It is not possible to explain how much this difference in printing depth should be, and furthermore it might be misleading, owing to the shortcomings of the printing process, to attempt to illustrate it, but the difference must be considerable and a trial inking is suggested which will at once give a far more reliable guide.

After development and fixing, as usual, the print must be washed as thoroughly as already described in Chapter III.

DRYING

This is a most important step and the instructions already given *must* be most carefully observed. This is especially important as regards the superdrying, and under no circumstances should this be omitted as otherwise the high-lights and half-tones would prove to be impossibly difficult, when inking.

TANNING AND FIXING

This part of the processing is also unchanged, but it should be stressed that the fixing time must not, on any account, exceed the time given in both Chapter III (after development) and in Chapter IV (after bleaching and tanning).

If anything, both these fixings could be slightly reduced in time, but at all events they should not be any *longer* than stated, and neither must *either hypo bath be stronger than the strength given in Chapters III and IV.*

This, again, is dictated by the necessity of taking steps to retain all possible high-light detail. The matrix must then be dried and superdried.

SOAKING AND INKING

If the matrix were now treated as though it were on standard bromoil paper it would be found that, after soaking, it might, by painstaking inking in the hands of a skilled worker, be possible to produce some sort of a reasonable result -- but only if the brush technique was of the highest order.

The supercoating would make its presence obvious by refusing a key for the pigment with the result that there would be a great danger of any pigment deposited, being picked up again by the brush, and on being forced onto the surface would probably give an unpleasant granular result -- owing to the clumping of the pigment particles (stipple). This would be the natural result of the brush having become overloaded with pigment which, until forced on, has been lying more or less free on the surface, only to be picked up repeatedly during the prolonged brush action.

However, experiments have proved that these difficulties can be overcome by modifications to the soaking technique, in many cases, and furthermore these modifications only concern the temperature at which the soak is carried out, *and the inclusion of a further soaking and drying stage.*

After the usual final wash, following bleaching and tanning, the matrix, when thoroughly dry, should be given a presoak followed by another drying. Thereafter, all that remains to be done is to soak, when the matrix is required for pigmenting, but at a higher temperature than if the print had been on bromoil paper. The details of this presoak and final soak are stated in the following paragraph.

The presoak, **after tanning and drying, should be carried out by immersing the dry print in cold water until limp, and then transferring it successively into water raised at each stage until it is finally in a soaking bath at 110°F, where it should remain for at least 15 minutes. There is no necessity to keep the temperature up to 110° for the whole of the soaking time, it can be allowed to fall gradually during the operation. When this has been done, and after gently and carefully swabbing the surface free from tear-drops the matrix should be dried, and superdried once more.**

When soaking for inking, **the dry print should be similarly soaked in cold water, with the temperature raised in stages, until it has reached 100°F, and from this point it should be timed to remain a further 30 minutes, or possibly a little less, depending on the worker's brush technique, before inking is actually commenced. Once more there is no need to keep the temperature up to the figure given *during the whole of* this soaking period.**

With many papers, provided they have a suitable surface for ink acceptance, the above method gives excellent results, but it will be realised that sometimes due to excessive hardening of the emulsion for instance, a particular paper will not respond readily, and in such cases even a *second presoak* will be found to help. If a second presoak is required it should be carried out exactly as advised above, and the worker should resist the temptation to raise the soaking figure beyond the 110°F advised. This figure should be regarded as an absolute maximum,

in order to avoid breakdown of the emulsion high-lights (especially) under subsequent brush action.

Generally, supercoated papers, being harder and tougher, do not show undue softening providing ordinary care is used in inking, in spite of the high temperatures to which they have been subjected, but, nevertheless, it is a wise precaution, when transfer is the aim, to use *damped* final support paper. If this were not done, especially when transferring on to one of the *Hot Pressed* or plate papers, it might well be found that the high-lights of the matrix would have a decided tendency to stick severely to the final support, after having been subjected to the heavy pressure of the press -- in which case damage would probably be caused to the matrix, when separating.

It would be as well to repeat the stages of the special processing, necessary for supercoated papers.

These are as follows: --

(1) Making the somewhat heavier print, and drying.

(2) Bleaching and tanning, and drying.

(3) Presoaking, and drying -- once at least with the possible advisability of repeating this.

(4) And finally, soaking for inking.

I have used this method for some time now, after a good deal of practical experimental work, and am satisfied that the combination of the special superdrying technique, presoak, and final soak, at the given temperatures has, in the main, solved the problem of ink acceptance on supercoated papers *having suitable surfaces.*

There is no doubt at all that the alteration in character of the gelatin emulsion, brought about by *repeated wetting and thorough drying,* reacts in favour of ink acceptance.

Additionally I still believe that further improvements are possible by presoaking the print *before tanning* -- in order to assist the action of the tanning bath, but while my experiments in this direction are, as yet, inconclusive, I am of the opinion that good results will follow, in time.

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